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HIS EXCELLENCY SIR HERBERT WILLIAM EMERSON,
K.C.S.I., C.I.E., C.B.E., I.C.S.,
Governor of the Punjab and Patron of the
Punjab Provincial Co-operative Fruit Development Board.

MESSAGE

from

HIS EXCELLENCY SIR HERBERT WILLIAM EMERSON,
K.C.I.E., C.I.E., C.B.E., I.C.S.,
GOVERNOR OF THE PUNJAB AND PATRON OF THE PUNJAB
PROVINCIAL CO-OPERATIVE FRUIT DEVELOPMENT
BOARD



Government House,

Lahore:

November 25th, 1936.

I am very glad that the Punjab Provincial Co-operative Fruit Development Board has decided to publish a Journal which will deal mainly with matters of interest to fruit growers. I believe that there is great scope for the development and improvement of fruit growing in the Province, and congratulate the Board on their enterprise.

I wish the Journal every success.

(Sd.) H. W. EMERSON,

Governor of the Punjab.

MESSAGE

from

HON'BLE CHAUDHRI SIR SHAHAB-UD-DIN,

Kt., K.B., B.A., LL.B.,

Minister of Education, Punjab Government,

Chairman, Punjab Provincial Co-operative

Fruit Development Board



3, Durand Road,

Lahore, 23rd December, 1936.

I congratulate the Board on its excellent start and wish it success in achieving its laudable aims and objects. I hope that the Zamindars of the Punjab, whom the Board intends to serve and support, will co-operate with it whole-heartedly.

(Sd.) SHAHAB-UD-DIN,

Kt., K. B., B. A., LL.B.,

Minister of Education,

Punjab Government.



HON'BLE CHAUDHRI SIR SHAHAB-UD-DIN,
K.T., K.B., B.A., LL.B.,
Minister of Education, Punjab Government,
Chairman, Punjab Provincial Co-operative
Fruit Development Board.

THE PUNJAB FRUIT JOURNAL

No. 1

LYALLPUR, JANUARY 1937.

Vol. 1

OURSELVES

It is a convenient and a useful journalistic convention that all excursions into the realm of the Fourth Estate should have to introduce themselves to the public by stating the ideas which animate those who are responsible for these ventures.

"The Punjab Fruit Journal" is intended frankly to be an organ of the Punjab Provincial Co-operative Fruit Development Board; and yet as its name suggests it has infinitely wider functions to perform than merely to publish the official reports of the activities of the Board.

To build up a national fruit industry in this province based on scientific, economic and progressive basis, we have so to reorganise it that the industry occupies an integral part in the future industrialized Punjab. The interests of the fruit growers and the industry must be safeguarded, and so incorporated in the fabric of national industries that fruit-growing in the land of the five rivers comes to be regarded as a valuable asset, and its prosperity and achievements considered as factors in the rural wealth of the province.

A journal which claims to be an organ of the Fruit Development Board and the fruit growers must necessarily reflect their views. But there is a task greater than that which the Punjab Fruit Journal has set itself to perform. It hopes to lead as well as follow public opinion as to the important industry of fruit-growing in the Punjab. The journal will provide a forum for the discussion of the many-sided aspects of fruit growing. Endeavours will be made to include useful information on horticulture for the benefit of our readers. While expert and specialized advice on fruit-growing will be made available through these pages, it shall be our consistent

endeavour to make such information as less technical and academic as possible. Among other features of the Journal will be news from various District Fruit Growers' Organizations. Market news will also find their proper place. Problems of the fruit industry discussed from a common-sense point of view will also be included. There will, moreover, appear extracts from horticultural journals of foreign countries. It is hoped that through these features the members of the Board and our readers will be kept in touch with the latest trend of the fruit industry.

Since the days when fruit farming in the Punjab was confined to a few landlords who laid them as pleasure gardens rather than as commercial propositions, much headway has no doubt been made through the initiative of the Agricultural Department, but much still remains to be accomplished by improving nurseries and by adoption of up-to-date methods brought to knowledge through the latest researches of horticulturists. It is also partly to fill this need that the **Punjab Fruit Journal** justifies its appearance.

Before concluding it seems advisable that the object of the Board of which the Punjab Fruit Journal is the organ, should also be briefly stated. It exists to promote the economic interests of its members by developing fruit culture; inclusive of rendering advice as well as technical assistance, arranging the availability of reliable plants, fertilizers, garden implements etc. at reasonable rates, securing facilities from Government, local bodies, transporting agencies etc., developing and extending market for fruit and fruit-products, maintaining a directory of fruit growers, reliable nurserymen and important fruit merchants, and publishing and circulating literature on fruit-farming and fruit-preservation. As to the composition of the Board it is enough to state that among its members who number several hundred are all the important fruit-growers of the province. A reference to the speech of H. E. the Patron and the President of the Board, which appear elsewhere in these pages, will give our readers a true picture of the ideals which inspire the founders of the Fruit Development Board.

We hope that fruit-growers in this land of the five rivers will find in our efforts sufficient momentum to enable them to rally to our cause which is equally their own.

In presenting the first issue of the Punjab Fruit Journal to our readers we wish them a happy and a prosperous new year.

A. W.

NEWS AND NOTES

The Hon'ble K. B. Chaudri Sir Shahab-ud-Din, the President of the Fruit Development Board who had for so long been guiding the deliberations of the Punjab Legislative Council as its President, took over the portfolio of the Ministry for Education some months ago. Despite his heavy ministerial work Sir Chaudhri Sahib has continued to act as the Board's President.

Members will also be glad to hear of Sir Chaudhri Shahab-ud-Din's unopposed return to the reformed Punjab Legislative Assembly.

(On such rare distinction richly deserved, we offer our hearty congratulations to our President.—Ed.)

* * * *

The fruit world offers rewards which are second to none. In the last Birthday Honours Sirdar Lal Singh, the Hony. Secretary of the Board received the title of Sirdar Sahib.

(The Development of the Fruit Industry in the Punjab owes much to the untiring energy of the 'Sirdār Sahib' whose efforts in this regard constitute without exaggeration a record in the annals of the fruit-growing industry of this province. While congratulating him on this honour, we venture to express the hope that this may prove to be a fore-runner of greater honours yet to follow.—Ed.)

* * * *

Mr. H. R. Stewart who through illness had been obliged to proceed home on 8 months' leave has returned and resumed his work as the Director of Agriculture, Punjab. During his absence K. B. Maulvi Fateh-ud-Din who acted as Director of Agriculture proved himself a most popular and able officer.

(We extend our warm welcome to Mr. Stewart on his recovery from illness and return to the Punjab.—Ed.)

* * * *

Captain L. Mitchell of the Indian Mildura Fruit Farm, Renala Khurd, has returned after a well spent holiday abroad.

(He has brought us some very useful hints regarding fruit improvement. During his tours in the West he sampled some good varieties of apples and has suggested introduction of a variety 'Granny Smith'

from New Zealand which is expected to withstand storage under the Indian climate.—Ed.)

The Department of Agriculture, Punjab is shortly launching experiments on Citrus Stock and Grape-hybridization at Montgomery. The work will consist of raising various citrus fruit trees on different citrus stocks, with a view to improve existing varieties, and possibly to evolve better ones suited to varying conditions prevailing in the Punjab.

* * * *

As a result of a representation to develop fruit industry in the Kangra district, with a view to ensure better nutritive diet for the people of that tract, and at the same time to conduct research in hilly fruits, the Department of Agriculture has made arrangements to start an Experimental Garden and Nursery at Palampur (Kangra district).

* * * *

Spraying machines made in Japan have recently been introduced in the Punjab by K. S. Ch. Niaz Ali of the Jamalpur Fruit Farm, Sarna (near Pathankote). These machines are moderately priced and trials by the Government Entomologist at Lyallpur proved them to be efficient.

The machines are manufactured by the Yokohama Nurseries Company, Yokohama, Japan. Prices of these machines and their accessories are as follows:—

1. Barrel Sprayer	..	Rs. 46/-
2. Semi-automatic Sprayer	..	Rs. 42/-
3. Semi-bucket Sprayer	..	Rs. 28/-
4. Portable Bucket Sprayer	..	Rs. 15/-
5. Junior Bucket Sprayer	..	Rs. 5/-

Accessories

1. Bamboo Extension Rod	..	Rs. 4/-
2. Giant Simplex Nozzle	..	Rs. 2/-
3. Duplix Angle Nozzle	..	Rs. 2|8|-
4. Nozzle for Orchard Spraying	..	Rs. 2/-

* * * *

A company under the name of the Cold Storage Company of India Ltd., has been floated with a view to carry on refrigerating business and cold storage trade, by Messrs. Govan Bros. Ltd. The company has entered into agreement with the Defence Department of the Government of India who will rent cold storage space for 15 years. Depots will be established at Wana,

Mari Indus, Peshawar, Ferozepore, Manzai, Kohat, Nowshera, Jullundur, Bannu, Thal, Rawalpindi, Multan, Razmak, Quetta, Sialkot and Ambala to cater respective military areas, and also at Delhi, Lahore and Amritsar for commercial trade requirements.

* * * *

The next Punjab Fruit Show is to come off on the 13th of January, 1937, and will last for four days instead of three days as heretofore.

The N. W. Rly. will grant as usual concession for the carriage of exhibits at quarter parcel rates. Exemption from terminal tax has also been obtained from the Lahore Municipal Administration.

Prizes will also be given to best exhibits from the Districts in addition to best provincial exhibits.

(As the Fruit Specialist, Punjab observes "the Punjab Fruit Shows that have been held at Lahore for the last several years have been serving their intended purpose of (1) bringing the fruit growers into close touch with every class of people concerned with the fruit industry, (2) providing unique opportunity to fruit growers and others of exchanging ideas on topics of common interest, (3) bringing to the notice of the public the best varieties of fruits grown in the province and thus enabling the prospective fruit growers to plant only the selected varieties of fruits in their gardens, (4) encouraging manufacture of fruit and vegetable products such as lemon and orange squashes, fruit juices, crystalized fruits, jams, tomato sauces etc. The quality of citrus fruits in general and fruit and vegetable products in particular has been improving beyond expectations from year to year." Members would therefore be well-advised to take the earliest opportunity to communicate with the Fruit Specialist and obtain further particulars of the Show.—Ed.)

* * * *

The U. P. Government is organising an All-India Industrial and Agricultural Exhibition at Lucknow. The Exhibition commenced on December 5 and will remain open until February 4, 1937. Its aims and objects are to provide, a panorama of Industrial and Agricultural India, and to place before the public the latest developments of a practical nature in agriculture and industry.

* * * *

The names and addresses of some of the principal fruit-growers of the British Empire appear in the latest edition of the British Empire Trade Index published by Business Dictionaries Ltd., London.

* * * *

Following are some of the recent publications of interest to fruit-growers which are mentioned in the latest issue of "Agriculture and Livestock in India."

Horticulture Abstracts.

Vegetative propagation of tropical and sub-tropical fruits.

The degeneration of strawberry.

The Nutrition of Manuring of soft-fruit.

The above publications are obtainable from the Imperial Bureau of Fruit Production, East Malling, Kent, England.

Cocoanut Cultivation, Government Press, Madras.

Papaya (Leaflet No. 1, 1936) Government Press, Cuttack.

Bagging of pomegranates, Government Press, Travancore.

The International Year Book of Agricultural Statistics.—The International Institute of Agriculture, Villa Umberto, Rome (Italy).

* * * *

The Imperial Council of Agricultural Research in their official publication entitled "Agricultural and Animal Husbandry in India 1933—35" observe that the period under review "mark an era of horticultural awakening in this country." Various provincial agricultural departments have taken up definite fruit research work. "In many respects," the report adds, "fruit-growing is yet in an undeveloped field of work in this country, and its development may lead to substantial monetary benefits to growers. The Indian public are being educated to the high dietetic values of fruit, with the result that the demand is daily increasing. The fact that the prices of Indian fruits have been comparatively less affected by the worldwide agricultural and economic depression, has encouraged an increase in the area planted to fruit trees."

* * * *

The acreage under fruit crops in the Punjab has increased considerably in recent years.

* * * *

Financial assistance has been rendered by the Imperial Council of Agricultural Research towards the expenditure now being incurred on fruit investigations in India. Rs. 2,500/- have been allotted for the preservation of fruit and vegetables and Rs. 7,020 for research on citrus "wither tip" in the Punjab. The Punjab also receives a grant of Rs. 58,000/- for a scheme of citrus stock grape vines.

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The Imperial Council of Agricultural Research has deputed a Physiologist for research work at the East Malling Fruit Research Station on the problem of alternate year-bearing of fruit trees.

* * * *

As a result of extensive manurial experiments conducted by the Punjab Department of Agriculture it has been found that sulphate of ammonia in conjunction with farmyard manure gives the highest yields for citrus.

* * * *

The question of the preservation of surplus fruit has been occupying the attention of the Imperial Council of Agricultural Research which has given a grant-in-aid for the investigations relating to the utilization of the surplus fruit and vegetables in the Punjab.

* * * *

Preparation of grape juice, lemon and orange squashes are giving encouraging results in the Punjab. Investigators also report that tomato ketchup and other tomato products can be bottled on a commercial basis with a considerable margin of profit.

* * * *

Cold storage experiments at Poona show that Alphonso mango can be preserved for nine weeks at 45° F. and that the Nagpur sangtara at 40°F. for about three months.

* * * *

[We shall be glad to receive news items for publication in these columns; but these must be of interest to our readers.—Ed.]

G R O W T H
NEW BUSINESS
IN THE TWELFTH YEAR
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**SPEECHES OF H.E. THE GOVERNOR, PUNJAB AND THE
PRESIDENT OF THE FRUIT DEVELOPMENT BOARD.**

[We offer no apologies for the two speeches reprinted below. They embody an important review of the fruit industry in the Punjab and its future scope. For this reason and in order to give permanent place in the Board's annals, these historic speeches find place in this Journal.—Ed.]

The text of the speech made by His Excellency Sir Herbert Emerson, Governor of the Punjab, and patron of the Board at the annual meeting of the Fruit Development Board at the Government House, Lahore on April 23, 1936.

* * * *

Hon. Sir Shahab-ud-Din, Hon. Minister for Agriculture and gentlemen!

I am very glad that you asked me to attend the annual meeting of your Board. Of course it gives me an opportunity to say a little about the work in the province. Unfortunately I did not receive a copy of the very excellent speech which your President has just made before my remarks had been printed and I had no time to enquire about certain points raised by the President in his speech. But I may perhaps say just a few words about them. The first one is the question of supply of water. Government realises the importance of giving double the amount of water supply. All that I can say is that certainly the Government will look into this question.

Then there is the question of land revenue and 'Kharaba'. There again I will have to look into the facts, but I should not be a little surprised to find that orchards are assessed to land revenue on different principles than those applied to other crops. If there is any injustice being done to fruit-growers, it will certainly be looked into and we will see if we cannot redress it. The same is the case with 'Kharaba', only one should remember that in the case of 'Kharaba', the question of orchards is a little different from the crops. I do not know quite what is meant by 'Kharaba' in the case of fruit trees, for instance if you take a mango tree, normally you have a very good crop one year and a very poor one in the next, it is unusual to get two good crops in two consecutive years. When the Settlement Officer makes up his accounts, he takes that into consideration and it is not assumed that you are going to have good crops. This is already being taken into consideration. On the other hand if in a year when there

ought to have been a good crop, there comes a hail storm or some other calamity which wipes out that crop, then I should be surprised to find that 'Kharaba' is not allowed. But we will again look into that question. Then another question mentioned by the President is that of fruit-growers in Kulu. We have been in negotiation with the Mandi Durbar for some time for taking over the maintenance of the Mandi road between Ghatta and the Mandi Town. The Punjab Government already maintains the road which comes from Mandi to Ghatta and our proposal is to take over the rest of the road at a considerable cost to the Punjab Government. I am sorry to say that some of the suggestions have not been successful and I cannot say that they would be successful. The Government certainly have had the matter under consideration for some time and has been prepared at a considerable annual cost, (the minimum would be Rs. 30,000 a year, though it will be more likely to be nearer 50,000 and the initial cost would be like anything up to two lakhs,) to take over the road.

Then as regards the planting of fruit trees alongside the roads. I think this a good idea. It is done in some districts, for instance Gurdaspur District Board has planted mango trees and so also the District Board of Hoshiarpur. At present I think Forest Officers advise both the Irrigation and Buildings and Roads Departments about the planting of trees alongside the roads so that we give a certain amount of attention to that, although not necessarily to planting of fruit trees. That also will be taken into consideration.

As regards financial assistance that will be looked into by the Hon'ble Member for Finance.

I now come to my regular speech.

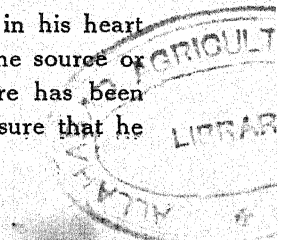
I am very glad that you have asked me to attend the annual meeting of your Board, because it gives me an opportunity of appreciating your work, and also of saying a little about fruit development in the province. Ten years ago, fruit growing was confined to a few districts in the province, and, although the income from orchards was even then considerable the methods employed were largely out of date, and private growers had no one to turn to for advice. Scientific fruit culture began when the Agriculture Department opened a special section in 1926. Indeed, I think that this was one of the schemes to which special importance was attached by Mr. Milne and myself, when, about that time, we drew up a programme for the general development of the Agricultural Department. However that may be, there has been remarkable progress during the past decade. We do not know the

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exact area under orchards at present, as a survey is carried out at intervals of five years; but we do know that, in the five years between 1928 and 1933, the area increased by 30 per cent, to 63,000 acres, and we are certain that, since then, there has been further expansion. Apart from the increase in area, there has been a big improvement in the general standards of orchards; for many old and unprofitable gardens have been uprooted and replanted with trees of better varieties. A large part of the total area under fruit is now scientifically planted. Better varieties are selected, proper care is taken with their planting, and their cultivation is done with greater care. Fruit culture has been accepted as a profitable form of investment, and men of substance are willing to put money into it and to aim at high standards. A very gratifying feature of your Association is that it includes big and small growers, and that among the former are men of real standing in the province. Your President, the Hon'ble Chaudhri Sir Shahab-ud-Din, fills this office, not because his experience as President of the Legislative Council will enable him to keep you all in order, but because he is a practical fruit grower, keenly interested in the industry and determined, so far as he is concerned, to prove that it is a paying proposition. I can testify to the excellent quality of grape-fruit he grows, because he is, from time to time, kind enough to send me some. Among other members of the Board, I notice the present Revenue Member of the Patiala State, a retired District and Sessions Judge, the retired Deputy Commissioner, Criminal Tribes, a leader of the High Court Bar, a Professor of the Veterinary College, Lahore, a retired Irrigation Officer and many others, who are applying to this business the enterprise and experience gained elsewhere. The variety of interest represented on the Board shows how great an appeal fruit culture is making. It is clearly the duty of Government to encourage and assist this industry in every possible way. As in other directions, we have been hampered by lack of money; but, nonetheless, we have been able, during the past two years, to appoint an Assistant Fruit Specialist and also to attach to the Department two Extra Assistant Conservators of Forests, who are now being trained in the various branches of the work, and will, I hope, be available for some years to help in extending the activities of the Department. One handicap in the way of expansion has been the inadequacy of nurseries, with the result that would-be growers have either had to import seedlings from other provinces, or to do without them. Thanks to the grant made by the Government of India last year for rural reconstruction we have been able to devote nearly half a lakh of rupees for this purpose. The money is being spent in enlarging the nurseries at Lyallpur, Sargodha, Gurdaspur and Jullundur and in starting nursery work at other centres in

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the province. The Department hopes that, within a year or so, they will be able fully to meet the public demand for nursery plants of good quality, and moreover to sell them at reasonable rates. Another difficulty which growers have experienced, is to obtain 'malis' with a proper knowledge of fruit growing. To meet this, a practical course which will last for a year, was started last October at Lyallpur. If it proves a success, I hope the Department will be able to open similar courses elsewhere. A lot of research work is being done, and here we have, from time to time, received financial assistance from the Imperial Council of Agricultural Research. The Council has recently sanctioned two new schemes: the first is to forestall the depredations of an insect pest, and the other is to investigate the question of root-stock. Very valuable results have been obtained in other countries by utilizing the most suitable root-stocks, and there is no reason why the survey now under contemplation should not give good results in the Punjab. Another survey is being carried out into the problems connected with the marketing of fruit. I attach great importance to this, because there is a danger that, if fruit cultivation continue to expand at its present rate, the ordinary markets may become over-stocked. If this danger is to be met, new markets must be found, and I believe there is great scope for this within the boundaries of the Punjab itself. I am sure that far more fruit is now eaten by the people than 20 years ago, and I am equally sure that the limit of consumption is not even within sight. But if fruit growers are to get the best advantage out of potential markets, they must have an effective organization, and I am glad to know that your Association is taking this matter up. Again, there is plenty of scope for the preservation of fruit, and also for the conversion of surplus and inferior fruit into various by-products. Here also, the Department is giving practical help. We have been fortunate in having an enthusiast as the head of the section since it was started ten years ago, and you will all agree with me in attributing much of the progress that has been made, to the efficiency and energy of Mr. Lal Singh, the Fruit Specialist. Whenever I talk to any fruit grower, I always hear high praise of the willing assistance he gives, and, although he is a very busy man, I see that he has also undertaken the duties of the Secretary of your Board. The Financial Commissioner, Development, and the Director of Agriculture are ex-officio members, and their presence represents a happy association between a Government Department and a private body. The Hon'ble the Minister for Agriculture is Vice-Patron of the Association, and I can assure you that he has a very warm corner in his heart for fruit growers. He is always trying to obtain money from one source or another to push on the work, and considering how little there has been to spare during recent years for beneficent activities, I am not sure that he



has not got more than his fair share. He will be able to look back on his Ministry with pride that he has been able to do a great deal in difficult circumstances for this branch, as for all other branches of Agriculture. From what I have said, you need have no doubt, if indeed you ever had any regarding the practical interest which Government take in your work and their desire to co-operate in every way. I wish your Board many years of fruitful work.

Address by the Hon'ble Ch. Sir Shahab-ud-Din, President of the Punjab Legislative Council and President of the Punjab Fruit Development Board Limited.

Your Excellency, Sir Jogindra Singh and Gentlemen,

Before stating how the Punjab Fruit Development Board came into existence and what amount of work lies before it, I may give a bird's eye view of the present state of fruit industry in the Punjab as compared with that of some other countries.

Fruit an essential part of human diet

Apart from economic considerations, the importance of production and consumption of fruits, in an essentially vegetarian country, like India, cannot be over-estimated or over-emphasised. The verdict of scientists is that fruits are rich in various forms of vitamin and are, therefore, essential for the development of human physique and the maintenance of human life. It is a well-known fact that fruits of various kinds have been grown in India from times immemorial. From the time of early Mughal rulers to that of Maharaja Ranjit Singh, nay, up to this day, the wealthy classes have always displayed great fondness for growing fruits. Some of the oldest mango groves bear eloquent testimony to the interest taken by the aristocracy of mediaeval India in fruit farming. Not only is our fruit industry of very ancient origin but some leading horticultural authorities say that several important fruits are of Indian origin.

Suitability of the Punjab for fruit growing

It is common knowledge that climatically the land of the five rivers is amply suitable for growing all kinds of fruits, inasmuch as it contains from the coolest hilly regions to the hot dry tracts where we can grow almost all kinds of fruits. Apples, pears, cherries, and walnuts, etc., which grow in the Kulu Valley and in the Simla Hills, are as good in quality as grown anywhere in the world. In the submontane tracts of the districts of Hoshiarpur, Gurdaspur and Kangra etc., where the climate is rather moderate, numerous mango trees are growing in an almost wild condition. In these tracts we can profitably grow peaches, plums, apricots, almonds, loquats, sangtaras and other fruits which flourish in moderate climate. In the canal colonies

we find a vast tract most suitable for citrus; while in the hot and dry districts of Multan, Dera Ghazi Khan and Muzaffargarh, where millions of indigenous date palms are growing like jungle trees, we can easily grow the date palms of Basra and Arabia. Generally speaking the soil of the Punjab is so rich, irrigation facilities are so great and labour is so cheap that we can, if we care, successfully grow almost all kinds of fruits which are being grown in any country in the world.

It must be confessed that, in spite of all the aforesaid natural and artificial facilities, we are the most backward fruit-growers on the surface of the earth. We grow so little fruit, as compared with the fruit grown in other countries, that I consider it humiliating to venture a detailed comparison. It is enough to say that in 1933-34 Palestine, with a population of less than that of the Lahore district, exported citrus worth about $3\frac{1}{2}$ crores of rupees; while we did not produce fruits, of all kinds and varieties, worth $1\frac{1}{10}$ th of that amount. It must be revolting to the self-respect of every Punjabi that we should be dependent on other countries even for fruits and that the far-off countries like California, Australia, South Africa and Italy, should be sending fruits to India in hundreds of tons. Those who, like me, have visited the Kashmir Fruit Mart, recently opened on the Lahore Mall will bear me out that the capital of the Punjab, to its disgrace, is importing foreign fruits in very large quantities.

Efforts to develop Fruit Industry in the Punjab

It is gratifying to see, however, that the rich as well as the poor in the Punjab are taking to fruit growing. Old gardens are either being uprooted or are being rapidly improved. Better varieties of fruits are being introduced and with the advice and help of the Fruit Department of the Punjab Government the standard of gardening is rapidly rising. The most encouraging factor in this connection is that His Excellency the Governor is very graciously taking a keen interest in the development of fruit industry in the Punjab. He full well realises, I presume, that agriculture in India has ceased to be as remunerative as it was before and that there is little chance for the hand labour of this country, ever to compete successfully with the machine work in foreign countries. He has been pleased to pay a special attention to horticulture and there can be no doubt that if all possibilities of fruit industry are explored and gardens are extensively planted, the industry shall make very rapid progress and soon become the most important industry of the province. The start is so hopeful and promising that, should His Excellency be pleased to pay a little more attention, the industry is bound to prove complete success; and when, after some time, a history of horticulture in the Punjab is written, the name of our illustrious Governor

will be written, in letters of gold, as the most kind and generous ruler who gave the greatest push and impetus to the industry and in whose time the industry made the greatest strides.

Formation of Fruit Growers' Associations

A couple of years ago, on the occasion of the Punjab Fruit Show at Lahore, it was suggested that if the fruit growers really wished to make their industry a success, they must organise themselves into a regular association. Last year the idea took a definite shape and a committee was appointed to frame rules for constituting such an association. The Committee met several times with the result that in May 1935 an association, called the Pb. Provincial Co-operative Fruit Development Board, was registered; but it did not start its work before the autumn of 1935. His Excellency was pleased, most kindly, to assent to be the Patron and the Hon'ble Minister for Agriculture agreed to be the Vice-Patron of the Board. For this kindness and encouragement both of them are entitled to the grateful thanks, not only of the members of the Association, but of all agriculturists and horticulturists in the Province. Their patronage and support have given a definite status to the Association, and there can be no doubt that the success it has already achieved or may achieve in future is, and shall be mostly due to the kindly interest they have been taking and will take in future in the development of fruit industry in the Province. I may mention that Raja Sir Hari Kishen Kaul, the Vice-President of the Association, Rai Sahib Lala Ganga Ram Wadhwa, the Treasurer, Sardar Bahadur Sardar Hari Singh, Captain Mitchell, Sardar Faqir Singh, Lala Mehr Chand Mahajan, Sardar Jagjit Singh, Chaudhri Mushtaq Ahmad, Sardar Satwant Singh, Khan Sahib Chaudhri Niaz Ali, the members of the Executive Committee of the Association have been taking very special interest in its work and have been ungrudgingly giving the requisite amount of time to attend its meetings. You will be pleased to learn that up till now 300 members have been enrolled from the various districts viz. Ludhiana 44, Lahore 32, Karnal 29, Montgomery 27, Lyallpur 21, Amritsar 21, Sheikhupura 20, Jullundur 19, Ferozepur 15, Jhang 10, Curdaspur 10, Jhelum 9, Rawalpindi 9, Kangra 8, Mianwali 7, Hoshiarpur 6, Gujranwala 3, Multan 3, Shahpur 3, Simla 2, Attock 1 and Ambala 1.

Local Associations

Local associations have been formed in the following places:—Pathankot, Sheikhupura, Muzaffargarh, Montgomery, Lyallpur, Amritsar, Ludhiana, Ferozepur, Karnal and Pind Dadan Khan. It is further hoped that within a short time not only will more branches be opened in many other districts and tahsils but that all prominent fruit-growers of the Pro-

vince will join the Association, which shall thus become a real representative of horticulturists.

Work of the Executive Board

Although a great deal of attention had to be devoted to the enrolment of members and the establishment of branch associations, the Executive Committee of the Board has done well during the past 6 months. Four meetings of the Committee were held and several sub-committees were formed to go into various important questions, e.g.,

- (a) the necessity of a decent fruit market and a cold storage at Lahore;
- (b) legislation to ensure the manufacture of fruit products under sanitary conditions and on scientific lines;
- (c) formation of a Bud Selection Society more or less on the lines on which such societies are working in other countries;
- (d) starting a fruit journal to keep the members of the Board in touch with the working of the Association and other matters of horticultural interest.

Funds

The Board has a big programme of work before it, but it is very much handicapped for want of funds. Up till now its income from membership fees is only about Rs. 4,000 which amount is hopelessly inadequate for carrying out the gigantic schemes of the Association, and, therefore we shall have to approach Your Excellency's Government for financial help in the hope that despite a deficit budget our request will receive a generous response.

Some matters of exceptional importance

Some important matters are going to be discussed in the General Meeting. So I need not refer to them at present. But two or three points have been so often discussed and emphasised by the members of the Executive Committee that I would like to invite Your Excellency's attention to those points:—

(1) The question of the supply of water for gardens is very strongly agitating the minds of fruit-growers and unless Your Excellency's Government liberally supplies water for planting new gardens in the canal colonies, there is no possibility for the development of the fruit industry in the colonies.

(2) The question of the land revenue on garden areas is the next important question. While fruit trees bear only once a year, revenue of

gardens is charged twice a year, which is far from fair. Crops, like sugarcane, occupy the land for about a year, but revenue on such crops is levied only once a year. So, there seems to be no justification why fruit gardens should be taxed twice, especially when the fruit growers have to pay the revenue without getting any fruit crop for the first several years, that is to say, until the fruit trees begin to bear.

(3) Again, the Government allows *kharaba* in the case of crops; but no such concession is extended to gardens, even when a fruit crop is entirely ruined through some calamity.

(4) Kulu fruit growers, who have undergone many hardships in establishing their fruit industry, have been facing great many difficulties in the matter of transportation etc. They have been clamouring for Government help, but I regret to say that their grievances have not been redressed. I hope that the Government will come to their rescue before it is too late.

(5) I venture to suggest further that, the desirability of planting fruit trees, like mangoes, *jamans*, *amlas*, etc., along the roads and canal banks, where the soil is suitable and irrigation facilities are available, may be considered by Your Excellency's Government. The total length of roads and canal banks in the Punjab is thousands of miles, and I am sure that if fruit trees are planted instead of *shisham*, *kikar* and such other inferior kinds of timber trees, the province shall benefit immensely. This is being done in America and Europe and there is no reason why such a scheme, if started with determination, should not succeed and pay in the Punjab.

Strength of the Department of Horticulture

The success of the fruit industry in the Punjab depends more on the efforts of the Department of Agriculture than on the united efforts of all agriculturists and horticulturists put together. The Zamindars know so little about gardening, manuring and pruning etc., that they cannot possibly achieve any success without the guidance and help of Fruit Specialists. The fruit preservation industry must grow side by side with the fruit growing industry and this also shall require expert advice and help. It is essential, therefore, that to make gardening a success sufficient expert staff should be employed by the Government to do the advisory and propaganda work by letters, lectures, demonstrations and leaflets etc. In this connection I may invite the attention of Your Excellency's Govt. to the recommendation of the Royal Commission on Agriculture in which they said that there was no branch of Agriculture in which right advice at the right time was more important than in fruit culture. I hope the Government will realise that mis-

takes in the new plantations e.g., mistakes in the laying out of gardens and the selection of suitable varieties of fruits etc., must be avoided by timely advice to the growers, as they cannot be easily rectified during the long life of the orchard. So far as I have been able to judge I consider that the present strength of the Department of Horticulture is hopelessly inadequate and that the present staff cannot possibly cope with the amount of work it has and shall be called upon to do by the fruit growers in the Punjab.

Appreciation

Before resuming my seat I must say a few words about the excellent work done by Sardar Lal Singh, the Government Fruit Specialist, as the Secretary of the Board. He has worked so hard and well that it is no exaggeration to say that he is the Executive Committee personified. Whatever has been done by the Committee, is more due to him than to all its members put together. He is an officer of extraordinary ability, and, I am glad to say that the fruit growing Punjab highly appreciates his services in the line of fruit culture.

Sardar Jogendra Singh and gentlemen. I am voicing, I am sure, feelings not only of the members of the Association but of the whole Zamindar Punjab, when I say that the Province is highly indebted to His Excellency, Sir Herbert Emerson, for the most keen interest which he has so kindly taken in its horticultural development; and that he shall be always remembered as the most sympathetic supporter of fruit culture in the land of the five rivers.



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FRUIT INDUSTRY IN INDIA

BY

Dr. G. S. Cheema, D.Sc., I.A.S.,

Horticulturist to Government of Bombay, Poona.

The current year opens a new era in history of the development of fruit industry in India. All major provinces and the leading Indian States have organised their fruit sections on modern lines and it is indeed a very happy augury that a large number of scientific and popular journals are now devoting space in their columns to the description of horticultural improvements in various parts of India. The Punjab Fruit Journal, although the latest addition to those already in existence, may prove to be the most valuable to fruit growers in India in general and the Punjab in particular.

India has well over five million acres under fruits and vegetables but possesses still greater potentialities both in acreage and production. His Excellency the Governor of the Punjab speaking at the last annual meeting of the Fruit Development Board had rightly said that there is great scope for the extension of fruit cultivation within the boundaries of the Punjab. The same remarks truly apply to all other provinces of India. It is, however, a sad feature that the acreage in India has remained more or less stationary for the last several years, though the imports of fruits by land and sea have increased and amount at present to an extent of nearly two crores of rupees. The increase in imports shows that the consumption of fruit in India is increasing rapidly. It is time now that a stock of the whole situation must be taken and ways and means devised not only to combat imports but to meet the increased demands in the country.

The important lines of work, therefore, for the development of the fruit industry would be the following:—

1. Improvement in the quality of seed, nursery and their standardization; methods of cultivation and control of pests and diseases.
2. Improvement in the system of transport, delivery, marketing and storage of fruit; and
3. Proper utilization of the surplus produce.

I have often thought that the soils and climate of the Punjab can help India to produce some of the most valuable fruit such as apples,

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plums and grapes that are at present imported from foreign countries. It is observed that a large quantity of fruit is imported into the Punjab annually from Afghanistan and distributed all over India. I feel that the present organ is likely to bring together information on such subjects and may go a long way in acquainting the public as to how fruits can best be grown in the land of the five rivers.

SEASONAL HINTS FOR IMPROVING OLD GARDENS

By

Lal Singh, Sardar Sahib, B.Sc. (Hons.), M.Sc. (Calif.),
Fruit Specialist, Punjab.

Winter season has arrived and Spring would soon be coming. During this period fruit trees are to be sprayed, pruned and manured against diseases.

1. In case any insect pest or disease has bothered you the trees should be sprayed and for this purpose the local Agricultural Assistant should be consulted who would correspond with the Government Entomologist or the Mycologist at Lyallpur to take the necessary action. In this Journal is given a list of some leaflets dealing with the methods of controlling the important diseases and insects and they should be carefully studied. Articles on the control of insect pests and diseases would frequently appear in this Journal for the benefit of its readers.

2. As regards pruning, different kinds of fruit trees require to be differently pruned but the following suggestions hold good in most cases;

(a) All diseased and dried branches should be carefully removed and burnt. Cutting should be done by pruning-shears or by saw in such a way that cut is smooth and bark does not split.

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(b) If the wound is more than an inch in diameter it should be coated with coal tar to disinfect it against diseases.

(c) Long cane-like branches that do not branch out except at extremity and these are abundantly found in Pomegranates, citrus trees, etc., should be cut at the base i.e., just where they emerge. They are called suckers or sprouts and they take away a great deal of nourishment which would otherwise go to the tree but at the same time they bear very little fruit and that also of poor quality.

(d) Branches that throw the tree out of shape may be shortened.

(e) Branches that are growing parallel and very close to one another and those that are too near the base of the trunk and touch the ground may be cut out.

(f) In order to encourage the production of fruit in the interior of the tree, thin out some of the branches where there is too much congestion.

(g) Pruning should be finished at least a week or ten days before the new season's growth i.e., sprouting starts.

(h) Trees like mangoes and loquats require practically no pruning; Citrus trees (Malta—Sangtra, etc.,) require only a small amount of pruning; trees like plums, apples, pears require moderate amount of pruning; trees like peaches, phalsa, grapes, etc., which bear fruit on new growth require rather heavy pruning. The general practice of cutting back the phalsa bush to the ground is to be deprecated. Best results are obtained when the bush is headed back to 3—4 feet height. Pruning of trees is rather a complicated matter which would be discussed in the next issue of the journal.

3. **Manuring:** Trees in most gradens in the Punjab are generally under-nourished. Any tree with dead, dried twigs and that appear old and worn out but whose bark on its trunk is sound and green (i.e., not split) can be rejuvenated i.e., brought back into healthy and vigorous condition by drastic pruning of its top branches (i.e., cutting out of the dead, dried old and worn out limbs) and subsequently by manuring the tree heavily in winter. The usual practice of digging pit just round the trunk of the trees and removing the fibrous roots (called 'Jalla' by the 'Malis') and then filling the pit with farm yard manure is to be condemned. All that is required is to remove soil 4—5 inch deep all round the tree as far as branches of the tree spread and then scattering well decayed farm-yard manure all round the tree and mixing it in the soil with spade and then putting back the soil that was originally removed so that farm-yard manure is not left on the surface exposed to atmosphere. About one maund of well decayed farm-yard

manure for every full grown Malta or Sangtra tree should be sufficient. In case sufficient manure is not available then for every tree about four lbs of Ammonium Sulphate may be mixed with farm-yard manure and applied to the trees. For detailed instructions refer to leaflet on manuring Citrus trees.

FREE POPULAR LEAFLETS

The following popular leaflets on Fruit Culture, Fruit Preservation and diseases of fruits in English and Vernacular are available for free distribution on application to the Director of Agriculture, Punjab, Lahore.
—Ed.

No of leaflet.	Subject.
40	1. Harmful effects of close planting. 2. Various methods of laying out of gardens. 3. Distances necessary for various fruit trees.
41	Heading back young nursery trees.
42	Preparation of mango Chutney.
44	1. Study of soil for fruit garden and 2. Soil requirements of important fruit trees.
51	Protecting trees from sun-burn.
58	Candying "bers".
61	Cultivation of strawberries; (102) Fruit Flies.
64	How to make orange marmalade.
68	Selection of plants; (88) San Jose Scale.
69	Wind breaks; (9) Citrus Psylla.
70	Planting of garden; (32) Mango Hopper.
77	Preparing tomato sauce.
78	Candying fruits.
79	How to place oranges in the market i.e. instructions regarding picking, grading, wrapping and packing of oranges in standard size boxes.
81	Protecting fruit trees from frost. Preparation of jelly from fruits.
95	Topworking of ber trees.
107	Diseases of Citrus trees.
109	General Hints on manuring of oranges. A note on various varieties of fruits grown in the Simla Hills.
114	Phalsa cultivation; (115) Phalsa Syrup.
121	Pests of fruit trees and vegetables.
124	Lemon squash.

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STANDARDIZATION OF MANGO CULTURE IN INDIA

BY

K. C. Naik, B.Ag. (Bom.), M.Sc. (Bristol).

SUPERINTENDENT,

FRUIT RESEARCH STATION, KODUR, P. O. (CUDDAPAH DT.)

The cultivation of mango has been one of the prominent rural occupations in India from time immemorial. Even now, this country almost holds monopoly for the production of the choicest varieties of this fruit, in spite of efforts that are being made in other countries in recent years to compete with India's unique position in this field.

See (Of all fruits that have attained commercial importance in India, mango is perhaps the least fastidious regarding soil conditions. It thrives under most diverse conditions whether it be the fertile Indo-Gangetic alluvial loams of the Punjab, the United Provinces, Bihar and Bengal; or the stiff black cotton soils of the Deccan, parts of the Central Provinces, Madras and some parts of Northern India; or the red laterite soils of Orissa and Madras; or the poor rocky, gravelly or light loam soils on the slopes of hills and lower mountain ranges. Even the wet paddy lands in certain areas and the limy or lightly alkaline soils in other parts appear to be tolerated by this fruit to a certain extent if other conditions are favourable.) The remarkably wide extent of its adaptability is further evidenced by the fact that this fruit thrives under rainfall varying from less than 25 inches per annum in the extremely dry tracts of Central India, Sind and parts of the Punjab to the usually copious downpours in parts of Assam, Bengal, the United Provinces, Bihar and even in the West Coast subject to an annual rainfall of over 125 inches.)

Under such widely varying conditions as these, it is not, therefore, surprising that one finds a marked difference in the dissemination and culture of varieties of mangoes in different tracts. The distribution of the most reputed varieties of India given in the following list bears ample testimony to the partiality displayed by different mango varieties to different conditions prevailing in this country.

Bombay, the Central Provinces & Sind.— Alfonso, Pairi, Cowasji-Patel and Mulgoa.

The Punjab.—

Langra and seedling types.

The Western United Provinces.—

Bombay Green and Yellow, Fajri and Langra.

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The Central United Provinces.—	Safeda, Desehri, Khasulkhas, Samar-behist and Langra.
The Eastern U. P. and Bihar.—	Langra, Zardalu, Fazri, Gulabkhas and Bombay Green and Yellow.
Bengal.—	Malda, Pulihora and other seedling types.
Northern Circars in Madras.—	Jehangir, Himayuddin, Banganpalle, Chinna Swarnarekha, Baramasis, and some juicy varieties.
West Coast.—	Olour, Mundappa, Neelum, Alfonso and Pairi.
Central Districts of Madras.—	Neelum, Bangalora, Baneshan (Banganpalle), Rumani and Mulgoa.
Southern Districts of Madras.—	Neelum and seedling types bearing two crops.

The general tendency of the mango growers in this country has been to plant a very large collection of varieties in their plantations without any regard to individual adaptability of the varieties to a given tract and inherent variations in the season of bearing of various varieties. Planting of Alfonso in the Punjab or in the Central Districts of Madras Presidency, or the early varieties, like Olour and Bangalora in Northern India or again the Baramasis in heavy rainfall tracts of the West Coast, merely because these varieties thrive in other tracts, is not a sound horticultural practice and has led to numerous uneconomical orchards all over this country.

Furthermore, a collection of a large number of varieties in a commercial orchard as opposed to a kitchen garden, is one of the fundamental orchard defects, which has unfortunately not been given adequate consideration in numerous orchards particularly in the United Provinces, Bihar, Bengal and Madras, where it is not uncommon to see over 100 varieties stocked in a single garden. In a commercial orchard, a tree is a distinct unit and the profitableness of the orchard is mainly dependent upon the production of a sufficiently large number of fruits from each of the various trees planted therein. From observations made in a large number of mango orchards throughout this country, it is obvious that hardly ten per cent. of the trees even in the most well-kept gardens can be termed as bearing remunerative crops. It is also further observed that wide variations in growth and production of individual trees is to a very great extent due to introduction of

varieties demonstrably unsuited to conditions under which they are grown. It, therefore, appears to be certain that planting of trees of only a few varieties of proved value to the tract will go to considerably enhance profits besides minimizing cost of upkeep by way of reduction in watching, picking, packing and marketing the produce.

It is only in very recent years that any organised attempt has been made to initiate research work on our Indian fruits in most of the provinces. With the impetus recently given by the Imperial Council of Agricultural Research and with the valuable work that is being carried out in other provinces by the Local Governments, it will not be long before the growers in this country are supplied with accurate knowledge regarding suitability or otherwise of each of the several hundreds of mango varieties to each tract along with detailed information on the various aspects of mango cultivation. The "zoning" of varieties and the standardization of cultural practices will then be possible but till that stage is reached, the growers will have to be guided solely on the basis of information gathered locally from the "trial and error" methods of culture of our fruit growers.

[Mr. Naik has been a member of the Fruit Section, Lyallpur for several years. We are glad to have this contribution from him and we expect more from him.—Ed.]

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RECENT TENDENCIES IN THE FRUIT RESEARCH WORK
IN THE PUNJAB

BY

Dr. Sham Singh, Ph.D., Fruit Section, Lyallpur

Most economic plants are raised either from seed or by rooting cuttings. When raised from seed they seldom come true to type; but when propagated from cuttings their roots and shoots have common origin and are therefore genetically (i.e., in origin) identical. A fruit tree has a sub-aerial portion or rootstock and an aerial portion or the scion. Rootstock is primarily chosen for its relative capacity for better growth and scion with particular regard to variety and quality of fruit required. The ultimate behaviour of the tree would then be the resultant of relative capacities of rootstock and scion that have deliberately been brought to function as one whole. It follows, therefore, that relation of scion and rootstock is of considerable importance and the horticulturist is presented with a host of problems arising from this reciprocal relationship between scion and rootstock. Considerable economic importance is being attached to problems of this nature in foreign countries. These problems rank as of major interest to both research workers and fruit growers.

Fortunately the Imperial Council of Agricultural Research has provided funds for conducting experiments on citrus rootstocks and hybridization of grapes. It is proposed to seek answers to the following questions of practical and economic importance:—

- (1) Which stocks would yield highest percentage of genetically identical offspring (apogamic seedling), essential for raising standardized material for use in fundamental investigations into such questions as manuring, pruning, fruit quality etc.
- (2) Which stocks would do best for malta, sangtara, and grape fruit, regarding
 - (a) growth and vigour,
 - (b) cropping quality,
 - (c) resistance to diseases,
 - (d) longevity,
 - (e) fruit quality, etc.
- (3) Behaviour of stocks in nursery rows with regard to their vigour and growth and their relative capacities for "take of buds."

- (4) Root morphology (i.e., structure) of different stocks and its bearing on irrigation problems.
- (5) Getting new varieties of grapes with particular regard to—
 - (a) earliness of ripening,
 - (b) cropping qualities,
 - (c) quality of fruit.

These questions are of great economic importance but are at the same time laborious and require a considerable time before their solution can be discovered. Information will be made available to the public from time to time as the results obtained justify their publication.

A DIRECTORY OF PUNJAB NURSERIES

It is the desire of the Punjab Provincial Co-operative Fruit Development Board to place at the disposal of fruit-growers in this province, a directory of some of the reliable nurseries in the Punjab. This can be accomplished only after a comprehensive survey.

It may here be mentioned that the Fruit Section of the Punjab Agriculture Department has also started nurseries on a large scale, but in its present initial stages it is not able to meet the heavy demands of fruit-growers throughout the province. It will, however, be able to commence making large supplies in about a year's time.

For nurseries to be ordered from the Agriculture Department communication should be addressed to the Fruit Specialist Punjab, Lyallpur.

Meanwhile the Board recommends the following nurseries which it is hoped will cater to some extent the needs of our members:—

1. The Superintendent, Lawrence Gardens, Lahore.
2. Ferozsons Gardens, Feroze Villa, Mahmood Booti, Near Shalimar, Lahore.
3. Jamalpur Fruit Farms, Near Pathankot, Railway Station, Sarna.
4. Indian Mildura Fruit Farm, Renala Khurd, Distt. Montgomery.
5. Mamoon Orchards, Near Pathankot.
6. Grawal Nursery Bishanpur, P. O. Doraha, Distt. Ludhiana.
7. Henbane Nursery, Saharanpur.
8. Mangal Singh Gardens, Shahdara.
9. Jieti Gardens, Chak 45, G. B. Gojra (Lyallpur).
10. Khalsa College, Amritsar.

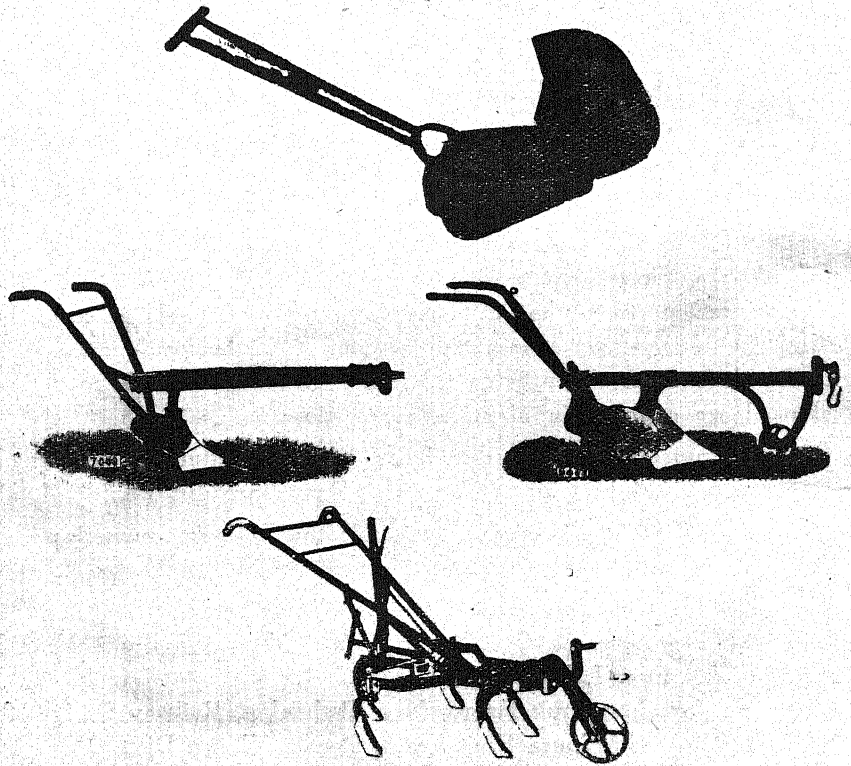
Members of the Board desirous of having their nurseries included in the list are requested to address the editor.

EDITOR.

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PRUNING ORANGE PLANTS

BY

S. Jalmeja Singh, E.A.D.A. (Fruit) Lyallpur

Pruning is a skilled operation and before discussing its technique it is necessary to state that this operation is usually conducted with a view (1) to imparting good shape and strong framework to the tree, (2) to promoting health and vigour of the tree by admitting proper amount of light and air and thus increase its fruit bearing area, (3) to promoting fruiting by maintaining proper equilibrium between growth and fruiting habit of the tree and (4) to facilitating spraying, fruit picking etc.

Pruning in early years

A low-headed orange tree with a symmetrical spreading and balanced crown is obtained by properly heading it back when planting; e.g. a 3½ ft. tall malta plant with branches 1-2 ft. long is cut back to 2½-3 ft. height with 4-6 scaffold branches, reduced to half a foot, retained distributed spirally around the stem. The next few years' pruning is confined to giving the tree proper shape and development of a low headed crown by retaining branches wherever needed and by removing them if they cause congestion. Suckers and water sprouts should be removed as soon as they appear but if absolutely necessary some may be retained to fill gaps in the frame work of the developing tree.

Pruning in later stages

An orange tree bears fruit on new as well as old wood and hence renewal of branch wood for fruit is unnecessary and even undesirable as it may throw the tree into a greater vegetative growth thus giving a set back to fruition. Old fruiting wood that has declined in its bearing habit may periodically be renewed. Senile, diseased and dead wood must be cut. Water sprouts and suckers are always removed, as they greatly tax the vitality of the tree without themselves bearing fruit in early years. If the trees grow dense, as they would in good localities if given good treatment, they will have a comparatively reduced bearing area as fruit would be borne only on outer surface and would thus be exposed to sun and wind; and here the congestion should be removed by cutting out some entire twigs but without causing large holes. In fact heavy thinning must be avoided in intensely hot localities where the sun-burn troubles are very likely to appear. I must emphasize that these twigs and branches are removed in their entirety, i. e.

flush with their mother branches, and are not merely shortened in length. The stubs will otherwise promote rather than relieve congestion by giving out clusters of twigs. And for the same reason shearing of outer surface for symmetry's sake is also to be condemned especially when the orange is naturally disposed to assume a good form. (Thus pruning in orange is restricted to cutting out water sprouts, suckers, dead, dying and diseased branches, periodical renewal of old bearing wood that has declined in bearing, and preventing any mass accumulation of useless branches that rarely bear and certainly detract the tree from fruiting ability by reducing light and air.)

Pruning is done soon after fruit has been picked and frost danger is over but sufficiently ahead of the commencement of spring growth.

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SUN-BURN OF CITRUS FRUIT

BY

S. S. Sardar Lal Singh, Fruit Specialist, Pb. Lyallpur.

Effect of strong sun on fruit as well as fruit trees known as sun-burn, sun-stroke or sun-scald is noticeable in gardens in one form or another. Branches or the stem of a tree directly exposed to strong sun are affected. The affected bark splits and eventually peels off. The writer has mentioned these injuries and has also suggested remedies in leaflet No. 51 of the Department of Agriculture, Punjab. Some observations were however recently made on citrus fruits in the Experimental Garden, Lyallpur, regarding (a) extent of sun-burn injury to the malta and the sangtara fruit as a whole, (b) extent of injury to fruits facing different points of the compass, and (c) effect of planting 'jantar' (*Sesbania egyptica*) along sangtara trees in order to provide protection from strong sun. It has been observed that the fruit directly exposed to strong sun is often badly affected and can generally be mistaken for diseased fruit. The affected portion of the fruit does not grow as rapidly as the remaining fruit. Skin tightly adheres to the fruit pulp and in severe cases the affected skin entirely dries up into a hard brown or black patch. Thus the fruit becomes mal-formed.

Sun-burn on malta oranges. Thirty representative trees were selected for the purpose of observations. The crop on the trees this year was much below normal. Total number of fruit as well as the number affected by strong sun on each tree was counted. Record was kept for this fruit on the tree with sides facing North-East, South-East, North-West and South-West respectively. The rows of trees ran from North-East to South-West. The results are tabulated below:—

TABLE I

Total No. of fruit on 30 trees.	Total No. of fruit affected with strong sun	% of affected fruit.	% of affected fruit North-East.	% of affected fruit South-East.	% of affected fruit South-West.	% of affected fruit North-West.
4070	614	15.1	5.2	13.5	24.9	14.3

From the above figures it is evident that the highest percentage of injury is caused to fruit on side facing South-western sun. This is

due to the sun being strongest during afternoon, thus affecting fruit on this side the most.

Sun-burn on sangtara oranges. Fourteen trees were altogether placed under observations. Six stood in the open and were thus fairly exposed to sun. The remaining eight trees were partially protected by the 'jantar' (*S. egyptica*) hedge running north-west to south-west. This hedge was planted for some other purpose but it certainly did afford some protection as it stood close to the sangtara trees. Fruit on all trees was counted on the same lines as adopted for malta oranges and results in case of the protected and the exposed trees respectively are tabulated below:—

TABLE II

Exposed sangtara orange trees

Total No. of fruit on six trees.	No. of fruit affected with strong sun.	% of affected fruit.	% of affected fruit North-East.	% of affected fruit South-East.	% of affected fruit South-West.	% of affected fruit North-West.
1878	422	22.5	10.0	15.4	23.3	16.3

TABLE III

Partially protected sangtara trees

Total No. of fruit on 8 trees.	No. of fruit affected with strong sun.	% of affected fruit.	% of affected fruit North-East.	% of affected fruit South-East.	% of affected fruit South-West.	% of affected fruit North-West.
2033	263	12.9	5.2	9.3	23.7	16.3

Percentage figures in Table II for affected fruit on trees facing the south-western and the north-western sun follow the same trend as in Table I. In Table III total percentage of affected fruit is only 12.9 as compared with 22.5 in case of unprotected trees (Table II). This means a decrease of nearly 50 per cent. In this particular case the hedge provided protection sufficient to decrease the total injury by 50 per cent. It is considered that if the hedge ran north-west to south-east it would be possible to decrease this injury still further. This will be tried next year.

It is also interesting to note that even out of the fruits affected on the north-eastern flank of the tree, only that fruit was affected which was directly exposed to the south-western sun. The fruit borne in the interior of trees was absolutely free from sun-burn showing the importance of encouraging the production of fruit in interior of the tree by thinning out branches where in thickets.

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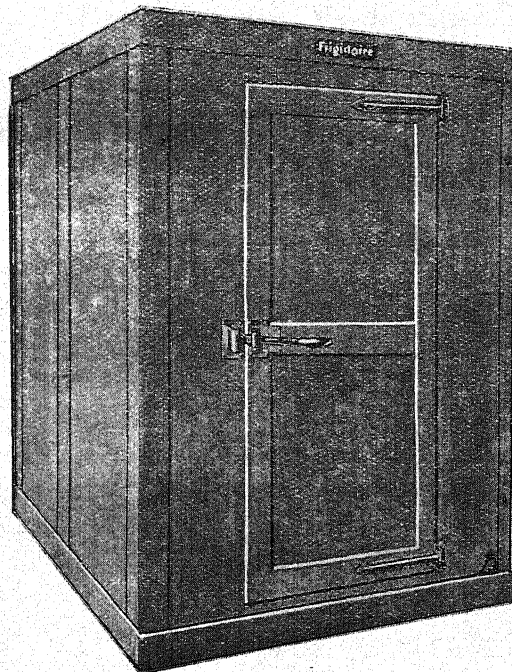
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**FRUIT GROWING:
AN ATTRACTIVE PROFESSION**

BY

**Khan Sahib Niaz Ali, Jamalpur Farm, Sarna
Near Pathankot**

Fruit growing has attracted attention of all people more than any other agricultural industry in these days of agricultural depression. Farmers, merchants, industrialists, lawyers, legislators, judges and even educationalists are all out for fruit growing for the reason that this fascinating profession is a paying hobby as well as business combined.

Undoubtedly an amateur fruit grower must not expect great financial returns if he cannot bestow his whole time attention and supervision. All the same if he is otherwise engaged in his own business, he will be amply rewarded, for his endeavours on his retirement, when he can take it up as a wholetime profession. He can then be sure of a dependable income and a pleasant occupation.

Business qua fruit farming is second to none and is in fact superior to many professions. Although development of industries on a large scale in an agricultural country like India appears problematical when majority of the populace is averse to factory discipline and organization, when technical ability is conspicuous by its absence, when capital is shy and when business ability is rare, yet conversion of a part of the farm into a grove of mangoes, or oranges or apples etc. may be feasible and safe, as it would only mean an internal adjustment in the traditional profession of agriculture. In a well laid garden having healthy vigorous and heavy bearing trees there is an element of security which perhaps the industrialist, the merchant or even the banker does not have, for such a garden as this is a perennial source of wealth and provides livelihood for generations.

Apart from its being a commercial proposition fruit farming is an interesting occupation full of colour and sunshine. Like the habit of cleanliness this occupation is next to godliness. Perhaps Adam started his career as a fruit gardener in the neat garden of Eden. Fruit grower is fortunate because of his safe investments and assured income. This industry certainly opens way for ambitious, intelligent and willing workers.

THE PUNJAB FRUIT JOURNAL

SOME PROMISING VARIETIES OF FRUITS

By

Lal Singh, Sardar Sahib, B.Sc. (Hons.), M.Sc. (Calif.),
Fruit Specialist, Punjab.

With a view to determine the suitability of various varieties of fruits for our conditions, the Punjab Agricultural Department has been trying at Lyallpur and other places a large number of varieties of fruits including about 140 varieties of grapes, about 80 varieties of bananas, about 4 dozen varieties of citrus and similarly many varieties of peaches, plums, mangoes, etc. For the benefit of readers some of the varieties that have so far been found promising are given below. For lack of space in this issue the characteristics of various varieties are left over for next issue.

Grapes

1. Nos. 15 and 27, green and seedless,
2. Kishmish,
3. Foster seedling,
4. Pandahri Sahebi (Poona),
5. Waltham cross,
6. Kandhari,
7. Black Prince,
8. Dakh.

CITRUS FRUITS

Malta-Oranges

1. Pine Apple,
2. Excellencis,
3. Vanielle,
4. Rubby,
5. Jafffa,
6. Valencia Late,
7. Dulcis,
8. Musambi,
9. Gujranwala, Bloodred.

Sangtara

1. Coorg,
2. Lahore Local.

Grape Fruit

1. Marsh seedless,
2. Foster,
3. Triumph,
4. Duncan.

Lemons

1. European,
2. Eureka,
3. Villa franca,
4. Kaghzi.

Bananas

Note: This Province is not suitable for growing good varieties of bananas, the essential requirements for which are the hot humid (moist) climate, plenty of irrigation and manuring and freedom from frost. Hot dry scorching winds in summer, severe frosts in winter and shortage of water in the Punjab stand in the way of successful cultivation of good varieties of bananas. The following varieties are recommended to be grown only on a small scale for supply of fruit for home consumption. They would, of course, require plenty of irrigation and heavy manuring:—

1. Puttubala,
2. Dwigosha,
3. M. Murtaban,
4. Rasabala,
5. Yelakhibala,
6. Pachanandan,
7. M. Champa,
8. Imrati,
9. Darobala,
10. Gujjubala.

THE PUNJAB FRUIT JOURNAL

The following varieties of dates introduced from Basra by the Agricultural Department have proved successful:—

1. Hillawi,
2. Khudrawi,
3. Shamran,
4. Zaidi,
5. Zeri.

Mangoes

Many varieties have not yet come into fruiting but the following varieties are quite successful:—

1. Langra,
2. Alfonso,
3. Aman Dusheri,
4. Samar-Bahishat Rampur,
5. Fajri Kalan,
6. Mohdwala.

MOTTLE LEAF DISEASE IN CITRUS AND ITS CONTROL

By

Dr. Sham Singh, Ph.D., Lyallpur

The mottle leaf disease is of common occurrence in fruit trees. In citrus trees, that are cultivated over so large an area in the Punjab, this disease has not yet assumed a serious importance, but nevertheless deserves attention as it does occur in many orchards to some extent. Mottle leaf, as it occurs, is characterized by leaves which become chlorotic (i.e., yellow) between veins. These pale areas stand out in contrast to the green surface around veins, giving mottled appearance. On trees affected by 'mottle leaf' there are usually present 'little leaves.' It was thus logical to suspect that two diseases might have a common cause and therefore a common cure. Other symptoms are: lack of general vigour, stunted growth or even die back and shortened internodes. These small leaves present an appearance of 'rosette.' This disease is, therefore, also called 'rosette leaf' disease.

Cause:—The exact cause of the disease is uncertain beyond the fact that it is a physiological disturbance. Various theories based on observations are advanced by several workers. (1) It may be due to calcium deficiency in the soil, or if calcium is present, it may be in an unavailable form. Furthermore the tree may be in such a condition that it may not be able to absorb calcium in required quantity. (2) Any treatment that weakens roots, intensifies mottling, e.g., deep tillage, excessive irrigation, heavy pruning etc. (3) Excessive amounts or depletion of some elements may cause mottling; e.g., excessive nitrogen, lack of nitrogen, excessive alkalinity, lack of iron, etc. (4) Sometimes incompatibility in the two parts of a tree that are brought to function as one, as is generally the case in budded or grafted fruit trees (i.e., where stock and scion are of different varieties) may be the source of mottling. For instance when Valencia oranges were budded on pomelo rootstock (*C. maxima*) they showed greater susceptibility to

mottling than when budded on sour orange (*C. aurantium*), i.e., khatta stock.

Remedial measures:—Previous attempts to remedy the little leaf disease in California consisted in application of iron sulphate in varying amounts to the soil. This treatment did cure the disease to some extent, but only the heavier applications were effective. The success was, however subsequently discovered to be due to the application of zinc applied to the soil along with iron sulphate as an impurity to the extent of about 4 to 5 per cent. Further trials to counteract this disease were confined to the application of zinc in form of zinc sulphate and zinc oxide. These trials proved quite effective in checking the disease so much so that vigorous growth resulted on affected trees during the very first season of their growth. Although the cause of the disease and the effect of zinc are not yet definitely understood, yet it appears from these trials that 'little leaf' and 'mottle leaf' diseases are not a case of soil deficiency or a problem of soil fertility, and that zinc may act as an antitoxin.

Zinc sulphate has been applied to the affected trees as (a) a spray, (b) by direct application to the soil, and (c) by injection in trunk of the tree. Of all these methods, the application of zinc as spray is considered to be more suitable if it is done in winter or early in spring. The following dose is considered effective in case of citrus trees.

Zinc oxide spray:—To prepare this spray use zinc oxide (having 70—79 per cent metallic zinc) in ratio of three lbs. to 100 gallons of water. This formula is safe, effective and economical. It is simple to prepare and it deposits minimum of spray residue on fruit. Zinc is specific for mottle leaf but will not compensate for unfavourable soil conditions, poor farming, or inadequate pest control. For maximum results mottle leaf treated orchards should be given adequate fertilization, but tillage should neither be deep nor excessive, and irrigation should carefully be controlled.

Method of application:—Distribution of spray over the tree should be as complete as possible. The amount of spray used may vary from 3—8 gallons per tree depending upon age of the tree.

Note: [The above method of control has not yet been given trial in the Punjab and the Agricultural Department cannot, therefore, recommend it as such until its suitability under Punjab conditions is tested which is being done now. As this method has proved highly efficacious in other countries, it is given here for the benefit of readers and fruit growers who may care to give it a trial on a small scale in their gardens.—Editor.]

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SEASONAL HINTS FOR PLANTING NEW GARDENS

By

**Lal Singh, Sardar Sahib, B.Sc. (Hons.), M.Sc. (Calif.),
Fruit Specialist, Punjab.**

Season for planting fruit trees has arrived. It would, therefore, not be out of place to give very brief hints on some important matters that prospective fruit-growers should bear in mind.

1. An amateur fruit-grower would do well in going through the leaflets on fruit gardening published by the Agricultural Department and list of which is given in this Journal. They can be had free of cost.

2. First thing that an intending fruit-grower should look into is the question of suitability of his soil for fruit garden. For detailed information reference may be made to the leaflet on the subject. But suffice to say that any soil which is neither too sandy nor too clayey (loamy soil being best) free from alkali or 'Kallar,' well drained, suitable for growing general farm crops like wheat, cotton, sugarcane, maize, potato, etc., may also be considered suitable for fruit garden provided pits dug to 4—5 feet depth show that the subsoil also is free from any layer of gravel, 'Kankar' coarse sand, etc., and that it is not clayey or plastic which in the Punjab is usually termed as 'Pilak'. Water level should not be nearer than 7—8 or preferably 10 feet.

3. Next in importance is the question of kinds of fruit plants to be planted. Every locality is not suitable for every kind of fruit. Plant only those kinds of trees that flourish the most in your locality and this can be determined by the general observations of fruit gardens existing in the neighbourhood.

(b) Mistake of planting many kinds of fruit trees mixed together in a single plot should be avoided. This is, unfortunately, a general defect

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noticed everywhere. Always plant different fruit trees in separate blocks because different fruit trees have got different requirements in regard to irrigation, manuring, cultivation, pruning, spraying, etc. All kinds of trees do not require irrigation at the same time. For instance deciduous trees (shedding their leaves in winter) like peaches and plums do not require irrigation in winter when the trees are in dormant condition, but evergreen trees like malta, sangtara, loquat, mangoes, etc., do require irrigation in winter. Similarly different trees are susceptible to different diseases which require different treatments. If different fruit trees are not planted separately in different blocks judicious spraying, manuring, irrigation, and other horticultural operations become very difficult.

(c) Care must be taken that trees obtained from nursery are free from diseases. It is much easier to prevent the insect pests and diseases from getting a foothold in your garden from the very beginning than to control or eradicate them when they get established in the garden.

(d) One thing that is of utmost importance is that fruit trees of unknown origin, even if available free of cost, should never be planted, for they may prove too costly in the long run. Our existing gardens are full of worthless trees which do not yield even 10 per cent of the income that should be expected of them. After all a tree of inferior quality occupies the same area of land, requires generally the same amount of care in irrigation, manuring, cultivation, spraying, watching, harvesting and transportation of fruit, etc., as a tree of good variety does but the difference in their yield of fruit or income may be immense.

(e) For those intending to plant very big orchards it may even pay to produce their own plants in case they have got some good high yielding trees producing fruit of high quality existing in their own gardens or those of their friends from where buds and grafts can be taken. Failing this, they should procure plants from only reliable nurseries. Agricultural Department, having started nurseries on a large scale only last year would not be able to supply plants on an extensive scale this year. In this Journal a list is given of some nurseries which are considered reliable and which agree to supply plants true to name. In any case, plants should be purchased after thorough enquiry and price of plants should not be of any great consideration. It is far better to plant 5 acres garden stocked with reliable trees than a 10 acres garden planted with trees of unreliable and doubtful parentage.

(f) Best tree is that which, besides being of good variety, is free from disease, is budded or grafted fairly low to the ground, has got branches

on all sides of the main stem emerging at different heights, has well developed root system, free from disease, knots, etc.

(g) General practice of planting too many kinds and varieties of trees is also to be condemned. A commercial garden must have not only a few kinds of trees but also a few successful varieties of each kind of fruit. It may be alright for a nurseryman to have a few trees of numerous kinds and varieties of fruits but this is highly uneconomical for a commercial garden.

(h) It is also risky to plant on an extensive scale new varieties of fruits which have not yet been tried in your particular locality. Always go in for such varieties which are already found successfully growing in your locality. Somewhere else in this Journal would be found a list of important varieties of various kinds of fruits that have been found successful by the Agricultural Department and which may be grown with advantage but in addition to these there may be others, that may be growing equally successfully in any particular locality, which may be planted and this matter should be thoroughly looked into by the prospective fruit-grower before he purchases the trees.

4. It hardly requires any emphasis that trees should be planted at proper distance and garden should be laid out in a systematic way. For detailed instructions reference may be made to the leaflet on the subject which gives instructions about the distance required for various fruit trees, different systems of laying out gardens, etc. Reference is also made to the leaflet on the heading-back or cutting-back of the young nursery trees.

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Our Speciality.

A SUMMARY OF THE BOARD'S ACTIVITIES

The first general meeting of the Board was held on the 23rd April 1936 in the Government House, Lahore. The meeting was attended by more than two hundred members. His Excellency the Governor who is the patron of the Board delivered a speech which along with the President's address appears elsewhere in this issue. In order to bring the benefit of the Board's activities within the reach of small growers, the rates of membership fees were reduced. The Chief Engineer, Irrigation, Lahore and the Commissioner, Rural Reconstruction, Lahore were elected as honorary ex-officio members. It was hoped that their advice and assistance could thus be made available to the Board. Resolutions were also passed at this meeting to request the Government (a) to charge *maliana* and *abiana* on fruit garden area once a year only, (b) to extend *kharaba* concession to gardens on similar lines as for ordinary crops, (c) to grant an enhanced water-supply for gardens. These matters have since been referred to the Canal Sub-committee. It was also resolved to approach the Government to grant a substantial subsidy so as to enable the Board to push ahead and continue its schemes until the Board became self-supporting.

The election of the current year's managing committee took place on 29th June.

Managing Committee for the year 1936

The following were elected office-bearers:—

1. Hon'ble Ch. Sir Shahab-ud-Din Kt., K.B., Minister for Education, Punjab, Lahore.
2. Hon'ble Mr. Justice Bakhshi Tek Chand, Judge High Court, Lahore.
3. Captain L. Mitchell.....Indian Mildura Fruit Farm, Renala Khurd.
4. K. S. Niaz Ali Khan.....Jamalpur Fruit Farm, Sarna, Pathankote.
5. S. Faqir Singh, Proprietor S. Mangal Singh Gardens, Shahdara.
6. S. B. S. Hari Singh, Model Town, Lahore.
7. R. S. Ganga Ram Wadhwa.....Lake Road, Lahore.
8. S. Satwant Singh, Rais 145|9 L. Chak, Montgomery District.

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9. S. S. S. Hukam Singh, Jietee Gardens, Chak No. 45-G. B. via Gojra, District Lyallpur.
 10. Dr. Mushtaq Ahmad.....Veterinary College, Lahore.
 11. L. Mehar Chand Mahajan.....23 Abbott Road, Lahore.
 12. K. S. Hira Khan, Village and P. O. Pallasaur, Tahsil Tarn Taran.
 13. L. Duni Chand, Bar-at-Law, 25-A. Jail Road, Lahore.
 14. Bhai Sahib Arduman Singh Chief of Bagarian, Ludhiana District.
 15. Capt. Mit Singh, O.B.I., Village and P. O. Katani, Kalan, Distt. Ludhiana.
 16. S. B. Dilbagh Singh, Hony. Magistrate, Lyallpur.
 17. Mr. J. W. Fairlie, Bar-at-law, c/o High Court Bar, Lahore.
 18. S. S. S. Ujjal Singh, M.L.C., 24, Wellington Road, the Mall, Lahore Cantt.
 19. Nawab Mohd Shah Nawaz Khan of Mamdot, Ferozepore Distt.
 20. Ch. Roshan Din, Vice-Chairman, District Board, Sheikhpura.
 21. S. Kartar Singh, Dewana, Chak No. 370, Sardarwala, Sheikhpura District.
 22. Nawab Faiz Ali Khan, Kingpura, District Karnal.
 23. Dr. A. Waheed, B.A. (Hons.), Ph.D., (London), Director "Eastern Times," 119, Circular Road, Lahore.
 24. Mr. Balak Ram, Bar-at-Law, Ganga Niwas, Lower Mall, Lahore.
 25. Mr. K. L. Saighal, Shivaji Fruit Mart, Ltd., Gobind Ram Street, Chamberlain Road, Lahore.
 26. The Commissioner Rural Reconstruction, Punjab, Lahore.
 27. The Financial Commissioner (Development) Punjab, Lahore.
 28. The Director of Agriculture, Punjab, Lahore.
 29. The Fruit Specialist, Punjab, Lyallpur.
 30. The Chief Engineer, Irrigation, Punjab, Lahore.
- The following were elected office-bearers:—
- Hon'ble Ch. Sir Shahab-ud-Din Kt., Lahore, President.
- Hon'ble Mr. Justice Bakhshi Tek Chand, Lahore, Vice-President.
- Sardar Sahib Sardar Lal Singh, Fruit Specialist, Punjab, Lyallpur, Hony. Secretary.
- Rai Sahib Ganga Ram Wadhwa, Hony. Treasurer.
- Dr. A. Waheed, B.A. (Hons.), Ph.D. (London),Ferozsons Gardens, Lahore, Hony. Joint Secretary.

The following Committees were also constituted:—

Marketing Standing Committee

1. Lala Mehr Chand Mahajan.

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2. S. S. S. Hukam Singh.
3. K. S. Niaz Ali Khan.
4. Capt. L. Mitchell.
5. Mr. K. L. Saighal.
6. S. S. S. Lal Singh.

Fruit Journal Standing Committee

The personnel appears on the inside of the cover.

On representation made to the Hon'ble Minister for Local Self-Government, the Secretary Transferred Department issued a circular notification to all Commissioners and Deputy Commissioners, whereby all local bodies are now permitted to contribute to funds of the Fruit Development Board. The Financial Commissioner Development has been requested to grant the Board a portion of the Government of India's Rural Reconstruction Grant, in order to enable it to meet initial expenses of the Board's proposed Fruit market at Lahore.

It was also resolved to request the Director of Agriculture, Punjab to give preferential rights to members of the Board in the matter of acquiring plants from Government Nurseries.

The Board was registered on the 18th May, 1935, but could not start functioning until October, 1935. After going through certain preliminaries the Managing Committee of the Board held six meetings from 14th October 1935 onwards. The Board arrived at the following important decisions:—

1. To appoint an Assistant Secretary who has since been appointed, and has completed his training.

2. To start a bi-lingual horticultural journal, of which the present is the first issue. The Journal is issued to all the members of the Board on a complimentary basis.

3. To establish a Fruit Market in Lahore. The organisation of the market is in progress; and representations have already been made to N. W. Railway authorities in connection with the proposed site of the market.

4. To organise bud selection societies on the lines on which these are conducted in foreign countries.

5. To approach the Government to enact legislation to ensure manufacture of fruit products under sanitary conditions and on scientific lines.

The Board, in conjunction with the Northern India Chamber of Commerce, Lahore, has requested the Government to frame rules under

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section 22 of the Punjab Pure Food Act 1929 to cover the following items:—

- (a) Specifying on label (i) quantity of saccharine used if any, (ii) contents of product stating nature and limits of preservatives used, (iii) the license number and (iv) certificate that contents conform to specifications under rules in force.
- (b) Inspection by the Fruit Specialist or the Health Officer associated with him of all premises used for manufacture and preparation of products.
- (c) Licensing of firms manufacturing such products.

6. To suggest that the Agricultural Department should give away prizes in form of medals instead of in cash, on the occasion of fruit shows.

The suggestion has since been accepted by the Agricultural Department.

To make a representation to Government for provision of extra water supply for fruit orchards.

The matter has been taken up by the Canal Sub-Committee, who will shortly wait upon His Excellency the Governor to place before him the Board's views.

8. To erect cold storage plant.

The proposal has been dropped because a certain firm will shortly instal, under Government patronage, cold storage plants all over the Province.

District Fruit Growers' Associations have been organised in about one dozen districts. Several of these, have already started functioning and have held District Fruit Shows.

ARE YOU A MEMBER?

If you are a member of a Local Body or a District Board, you will find it of interest to read the appeal circulated to all Deputy Commissioners in the Punjab by the Hon. Secretary of the Punjab Fruit Development Board which is reproduced below. We are encouraged to do so in the knowledge that quite a large number of the members of our Board are also members of different Local Bodies in the province, to whom eventually the appeal will in all probability be forwarded for action.

Many Local Bodies have already been subscribing towards fruit shows conducted in the past; and it is to solicit further liberal contributions and

assistance that the appeal is being brought directly to the notice of such of our members who are also members of local bodies.—Ed.

The Appeal

I have the honour to draw your attention to the Director of Agriculture, Punjab, D. O. No. 15933 dated 1st October, 1935, wherein a request was made to you to kindly help the cause of the Fruit Co-operative Movement in general, and of the Punjab P. C. Fruit Development Board in particular. The Managing Body of the Fruit Development Board, is highly indebted to you and your various Subordinate Officers for the enthusiastic push you have given to the Fruit Co-operative Movement in your District.

I am glad to inform you that about 400 Fruit Growers have already joined the Board, and the membership is sure to increase in the near future. In good many districts Local Fruit Growers Associations have been established, which have started to hold their own fruit shows etc. Our aim is to make every fruit grower of the province, big or small, interested in the Provincial Co-operative Fruit Movement directly or through the Local District Fruit Growers' Associations.

The Fruit Board has started well, and its inauguration has been welcomed by all who are interested in the development of the Fruit Industry. The Board has already appointed a paid Assistant Secretary Mr. K. L. Kohli, M.A., who is about to finish his special training at Lyallpur in the Fruit Section, and is visiting important orchards of the province, so as to acquaint himself with the leading fruit growers and problems confronting them. He will, after completion of the preliminary survey, start work in right earnest with his headquarters at Lahore. Arrangements are also being made to establish an up-to-date Co-operative Wholesale Fruit Market at Lahore for the sale of produce of members of the Board. The establishment of this Central Provincial Co-operative Fruit Market at Lahore will be followed by a chain of Fruit Markets in other towns of the province. The management of the Board has also made arrangements to bring out a bi-lingual Horticultural Journal for disseminating horticultural knowledge amongst the Zamindar community of the province and the first issue of the same will be out in a couple of weeks.

The Board has got an ambitious programme of work for the development of the Fruit Industry, and more particularly in encouraging better varieties of fruits, more effective control of diseases, use of standardised packing, and Co-operative marketing; and for the same agencies of Press and Propaganda will be lavishly employed. The amount of achievement in this mission will, however, depend upon the financial resources the Board

will be able to command through official and non-official agencies. As it is idle to expect to carry out such schemes with the paltry annual subscriptions from members alone, an enterprise like this, if it is to attain any measure of success, must have liberal support of the Provincial Government, and the various Local Bodies, and other allied institutions.

In this connection I may refer you to the recent Circular Notifications issued by the Secretary, Transferred Department to all Commissioners and Deputy Commissioners, viz:—

1. No. 3779-L.S.G.-36|35342 dated the 16th November, 1936, pertaining Small Towns of the Province;
2. No. 3908.-C.-36|35340 (L.S.G.-Comts) dated the 16th November 1936, pertaining Municipal Committees;
3. No. 3779-L.S.G. 36|35345 dated the 16th November 1936, pertaining District Boards;

whereby all Local Bodies of the Province are permitted to contribute to funds of the Fruit Development Board; and such contributions would be treated as fit charge on their respective revenues.

In your District there are a number of Local Bodies particularly the District Board, and the Municipal Committee of your District town, which can contribute good sums, while others may contribute less. The Fruit Board would feel highly indebted to you, if you would kindly move the District Board, and District Town Municipal Committee and other local bodies, to generously contribute towards the Fruit Development Board, so as to enable the management of the Fruit Board to launch its manifold beneficial schemes at an early date.

I shall be glad to address meetings of the selected Local Bodies of your District if you consider necessary, to impress upon members of the Local Bodies concerned the beneficent objects the Board has in view. For your information, I am sending under a separate cover five copies of the By-laws of the Fruit Board, which may kindly be distributed to the major local bodies of your District.

The management of the Board is in the hands of an unquestionably efficient representative responsible body consisting of high Government officials and public men, and consequently its funds are in safe hands. His Excellency the Governor was pleased to note in his inaugural address that responsible public men were taking keen interest in the Board. Besides H. E. the Governor as Patron and the Hon'ble Minister for Agriculture as Vice-Patron there are no less than five officials on the Managing Committee of the Board as ex-officio members, viz:—

1. The Financial Commissioner (Development).
2. The Commissioner of Rural Reconstruction.
3. The Chief Engineer, Irrigation Works.
4. The Director of Agriculture, Punjab.

And the Government Fruit Specialist as the Hony. Secretary. The Board is fortunate to have the Hon'ble Sir Shahab-ud-Din as its President and the Hon'ble Mr. Justice Bakhshi Tek Chand as Vice-President, and number of other leading public-men as members of the Managing Committee.

I shall be obliged to hear from you regarding this matter at an early date. All contributions may kindly be remitted to my address by Bank Drafts or Crossed Cheques."

DISTRICT AWAKENINGS

Lyallpur District

During the tenure of a very popular Deputy Commissioner, Mr. A. A. Macdonald, I. C. S., fruit co-operative movement gathered considerable force. Not only did the district send as many as twenty one members to the Provincial Fruit Development Board, but fruit growers of the district organised themselves into a live District Fruit Growers Association with Mr. A. A. Macdonald as president. In this capacity Mr. Macdonald took an active interest in the District Association work and he succeeded in inducing the Controlling Body of "Qila Gift Fund" to contribute a handsome donation of Rs. 1,000/- to the District Association's funds for nursery work.

In recognition of the keen interest displayed by him, the Lyallpur District Fruit Growers' Association presented a farewell address to Mr. Macdonald on the 21st October, 1936 on the eve of his transfer to the Amritsar district.

The new Deputy Commissioner Mr. V. B. Stainton, I.C.S., has also consented to carry on the presidential duties of the District Fruit Growers' Association.

As Mr. Macdonald is now the executive head of the Amritsar district we have no doubt that he would infuse the same spirit in the local District Fruit Growers' Association, as he did at Lyallpur.

Kangra District

The Kangra District Fruit Growers' Association recently sent a resolution to the Punjab Government drawing their attention to the restrictions on the transport of Kangra fruit through the Mandi State, particularly the heavy toll on lorry transport. If they succeed the Association will undoubt-

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edly pave the way to capture markets which are at present flooded with fruit from Kashmir and foreign countries.

In view of the heavy railway freight the Punjab fruit has lost considerable market in face of the dumping competition of Japan, California, South Africa etc. The Fruit Development Board hopes shortly to take up the question particularly as it relates to the Kangra fruit, with the N. W. Railway.

Ludhiana District

The district tops the list contributing a contingent of no less than 47 members to the Fruit Development Board. They have also organised the district Fruit Growers' Association. All this is due to the untiring efforts of and keen interest taken by Nawab Said Ullah Khan, I.C.S., who was until recently the Deputy Commissioner of this district. The credit is shared by his able Tahsildar Sardar Udham Singh, a man of untiring energy who is well known for his interest in every beneficent activity for the welfare of zamindars. We trust that Nawab Said Ullah Khan will continue to show an unabated interest in the provincial fruit movement in his new sphere of duties in the Jhelum district.

Karnal District

The district is well known for fruit growing. Best varieties of mangoes were exhibited (detailed description of the show appears elsewhere) in the last Fruit Show held in July 1936.

The fruit growers of this district are a strong body with K. B. Ahmad Hassan, a popular Deputy Commissioner at their helm, who is giving a great push to fruit farming. Karnal has contributed 34 members to the Provincial Fruit Development Board including seven life members.

Multan District

The Multan district, without an organised district association has sent 31 members to the Fruit Development Board. The fruit co-operative movement is becoming more and more popular in this district and applications for membership are still pouring in. We are indeed indebted to Mr. E. P. Moon, I.C.S., Deputy Commissioner, Multan and his judicial Tahsildar Mr. Nazar Mohammad of Kabirwala for active interest they are displaying in furthering the cause of the movement in this district.

Montgomery District

This district has one of the oldest district fruit growers associations, which unfortunately has not been very active for some time past.

Owing, however, to the active interest taken by Mr. Thapper, I.C.S., Deputy Commissioner, and Capt. L. Mitchell, one of our most enthusiastic executive leaders of the fruit movement, the district managed to send a

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solid block of 26 members to the Board. We are greatly indebted to Mr. Thapper for giving very valuable suggestions for the betterment of the Board's finances.

Sheikhupura District

The district, though a small one, can boast of having sent no less than 25 members to the Board. K. B. Sheikh Nur Mohammad, Deputy Commissioner, has been taking personal interest in furthering the cause of the fruit movement whether in Muzaffargarh or Sheikhupura. Thanks to the keen interest taken by him, the Sheikhupura District Fruit Growers Association organised a very successful fruit show last year and another is being arranged to be held on January 7, 1937.

(The editor would have very much liked to acknowledge in these pages the debt the movement owes to several other workers whose valuable activities in furthering the cause have contributed to its singular success in initial and no doubt difficult stages, but limitations of space prevent him from doing so in this issue.—Editor.)

PRESERVATION OF MUSEUM SPECIMENS

(Fresh Fruit & Vegetables)

[As queries for fixing original colour of fruits and vegetables to be exhibited in museums are every now and then received from the public, these instructions based on recommendations of Cruess and Christie of the California University are issued for the benefit of readers.—Ed.]

The specimens should be of large size, free from blemishes, of good colour, of sound condition and preferably gathered afresh. They are then cleaned, washed, colour fixed if necessary and stored in glass jars containing storing solution. The fixing and the storage solutions for different fruits and vegetables are given below:—

Fruits and Vegetables.	Fixing solution.	Storing solution.	
Citrus fruits	Not necessary	Distilled water	1 gallon
		Formalin	1/8 oz.
		Sulphurous acid	
		6% solution	1/2 oz.
		Boric acid	1 oz.
		Copper sulphate to give a faint green solution.	

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{	White grapes.		Distilled water	1 gallon
	Ripe pears.	Not necessary	Potassium Nitrate	1 1/8 oz.
	Yellow apples.		Boric acid	1 oz.
			Glycerine	6 oz.
			Copper sulphate to give a faint green solution.	
{	Black grapes.	Not necessary	Distilled water	1 gallon
	Other black fruits.		Formalin	3 oz.
			Glycerine	6 oz.
			Boric acid	1 1/2 oz.
			Salt	3 oz.
{	Peaches.	Distilled water	Distilled water	1 gallon
	Apricots.	1 gallon	Sulphurous acid	
	Red cherries.	Sulphurous acid	6% solution	1 oz.
	White cherries.	6% solution		
	Red grapes.	1 oz.	NOTE.—The solution is to be renewed every 6 months.	
	Other red fruits.	Formalin 1/2 oz. Glycerine 10 oz. Fix until red colour is changed to a uniform purple colour (usually 24-36 hours would suffice).		
{	White vegetables	Not necessary	Distilled water	1 gallon
	(Cauliflower,		Sulphurous acid	
	dry onions,		6% solution	1 oz.
	turnips etc.)		Potassium nitrate	1 oz.
			Salt	3 oz.
			Copper sulphate to give a faint green solution.	
{	Green coloured products	Fix in 5% copper sulphate solution	Distilled water	1 gallon
	(bananas, peas,	till the tint	Sulphurous acid	
	green leaves,	deepens (it will	6% solution	1 oz.
	cucumbers, etc.	require 24 hours or less).	NOTE.—1. The jar should be kept sealed well. 2. Solution is to be renewed every six months.	

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NOTE—Rinse in running water for 2-3 hours and then rinse in distilled water.

{ Tomatoes. Red peppers. Chillies.	Not necessary	Distilled water	1 gallon
	however if there	Salt	2 oz.
	be any green	Formalin	1¼ oz.
	leaves, they	Sulphurous acid	
	should previously	6% solution	1½ oz.
	be fixed in 5%	Potassium nitrate	1¼ oz.
	copper sulphate	Glycerine	9 oz.
	solution and then		
	thoroughly rinsed.		

THE PUNJAB "BER" TREES

By

P. Maya Das, Fruit Section, Lyallpur.

Ber (*Zizyphus Jujuba*) trees grow wild in almost all localities from the dry tracts of Multan and Mianwali districts to the submontane regions of Hoshiarpur and Gurdaspur districts. It has, however, been observed that although the wild ber thrives well in dry tracts of the Mianwali district but when top-worked with improved varieties, the tree bears fruit which does not ripen properly for want of sufficient moisture.

This observation that wild ber trees when top-worked with improved varieties need sufficient moisture in soil is supported by wild ber trees raised as wind-break along one boundary of the Experimental Garden, Lyallpur in 1930. In 1932, 36 of these trees were budded with improved varieties and they are now bearing excellent fruit. These trees stand near the main water channel and have not been given any other cultural attention.

Ber trees serve as wind-breaks, supply fruit and form a thick protective hedge. Budwood from Lyallpur trees has been extensively used for budding and top working thousands of trees every year all over the Punjab.

In 1936 these 36 trees planted about 10—15 feet apart, yielded 37½ mds. fruit which fetched an income of Rs. 111|9|-. The highest yield from a single tree was 119 seers. These figures give an idea of income that can be got even from trees planted on borders of fields and gardens as wind-breaks.

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The following table gives an idea of the size of fruit, yield, etc., of the improved varieties:—

Name of variety.	Length of fruit (C. M.)	Thickness of fruit. (C. M.)	% wt of stone to whole fruit.	Yield of fruit.	
				Mds.	srs.
Amran Nos. 9 & 11	4·81	3·3	4·1	5	38
Walayati Peondi No. 13	5·19	3·05	3·7	1	18

Fruit of improved varieties always fetches in the market a premium of 50 per cent or more over fruit of local varieties. Yields from these trees are expected to increase in the future when the trees attain full size. If the trees are planted at proper distance, i.e., about 30—40 feet apart, they attain very big size and trees are known to yield as much as 15—20 mds. of fruits each.

Top-working Campaign

From very encouraging results obtained by top-working wild ber trees at Lyallpur and other places in the Punjab it was decided to conduct top-working campaigns every year in order to improve wild ber trees and ber trees of inferior varieties growing in the zamindars' fields all over the Province. These campaigns are being run twice every year in March-April and August-September. Expert budders trained by the Fruit Section of the Department of Agriculture, Punjab, are sent out in batches to various places from where requisition for top-working ber trees have been received. The budders take bud-wood of improved varieties with them and subsequent supplies of fresh bud-wood are despatched from Lyallpur according to requirements. This entails a very careful and accurate working out of the programme so that bud-wood despatched should reach fresh for use without its getting dried.

It is not always possible to find trees to be top-worked growing collectively in one place and the budders have therefore to go about from place to place budding scattered trees, which means extra labour and use of a lot of time. In spite of these handicaps the campaigns conducted so far have proved very useful.

The average percentage success in budding obtained so far has been 50—60 per cent and in some cases it has been even 100 per cent. Experience gained during the last campaign in the Jullundur tract shows

that top-working ber trees in this particular tract almost fails when budding is done during August-September. The failure is attributed to adverse climatic conditions especially rain prevailing in this tract during these months.

The demand for top-working wild ber trees, from all over the Province, has been very heavy and is increasing every season. For the 1936 August-September campaign total requisitions aggregated over 16,000 trees. It was, however, impossible to cope with this demand with the small staff of trained budders available.

All work in these campaigns is done free of charge and even the bud-wood is supplied gratis.

The large number of trees thus improved every year will bring a considerable additional income to their owners at practically no cost to them. Ber is a poor man's fruit and comes at a time when no other cheap fruit is available especially in rural areas. This increased production will therefore not only help the zamindar financially but will mean cheap supply of fresh wholesome fruit for poorer classes.

For Shade Tree Seeds, Vegetable Seeds, Flower and Grass Seeds, Bulbs and all varieties of fruit plants, new Crotons, Roses, Creepers, Shrubs, Foliage plants, Ferns, Palms, Economic plants, Timber plants, etc., etc.

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ACCOUNTS OF THE PUNJAB PROVINCIAL CO-OPERATIVE FRUIT DEVELOPMENT BOARD

The Honorary Secretary submitted a statement of Accounts audited by the Inspector, Co-operative Societies, Lahore up to the 8th June, 1936, in the Annual General Meeting of the Board held on the 29th June, 1936. It was as under:

Registered—12-5-35

No. of Members—336.

Balance Sheet up to June 8th, 1936.

	Rs.	a.	p.
Income vide receipt book No. 3 (1—100)			
Book No. 4 (1—100) Book No.			
5 (1—65) through Secretary	.. 3,918	0	0
Vide Receipt No. CII to CI-43			
through Treasurer	.. 709	3	0
Total	.. 4,627	3	0
Expenses Rs. 17/7 through Secretary			
Rs. 59/12 through Treasurer	.. 77	3	0
Total	.. 4,550	0	0
Colony Bank, Lyallpur	.. 1,958	5	0
Punjab Provincial Co-operative Bank,			
Lahore S/B Account	.. 2,288	11	0
C/B Account	.. 203	0	0
Cheque in process of collection	.. 100	0	0
Total	.. 4,550	0	0

Checked and found correct and all the entries have been kept in the ledger.

Dated: 20-6-1936.

(Sd.) MOHD ALI SHAH,
Inspector, Lahore Tehsil.

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As the Financial year of the Co-operative Department for the Provincial bodies is accounted for till 31st August, 1936, the Accounts of the Board were further audited and to-date Balance Sheet, and Profit & Loss Account for the intervening period prepared and duly certified as under:

Balance Sheet of the Punjab Provincial Co-operative Fruit Development Board as on 31-8-36.

Liabilities.

	Rs.	a.	p.
Subscription realized	.. 5,341	3	0
Establishment payable	.. 75	0	0
Total	.. 5,416	3	0

Assets.

S.B. with P.B.	.. 4,357	4	0
Current with P.B.	.. 219	0	0
Current with Colony Bank, Lyallpur	.. 440	5	0
Bills recoverable (Cheque under collection)	.. 100	0	0
Imprest with Asstt. Sec.	.. 13	10	9
Deficit as in the previous statement of accounts	.. 77	3	0
Deficit as per Profit and Loss statement attached	.. 208	12	3
Total	.. 5,416	3	0

I have audited the above balance sheet of the Punjab Provincial Co-operative Fruit Development Board, Ltd., as on 31-8-36. In my opinion such balance sheet subject to my supplementary report exhibits the true and correct view of the Board's affairs according to the best of my information and the explanation given to me and shown by the books of the Board.

Inspector C. S., Lahore City.

Dated: 19-12-36.

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Profit and Loss of the Punjab Provincial Co-operative Fruit Development Board, from 9-6-36 to 31-8-36.

Profits

	Rs.	a.	p.
By interest on deposits with Colony Bank ..	3	2	3
By interest on deposits with P. B. ..	13	4	6
Total ..	16	6	9
Debit balance (loss) carried to the balance sheet ..	208	12	3
Total ..	225	3	0

Losses

Establishment paid ..	75	0	0
Establishment payable ..	75	0	0
Postage ..	27	3	6
Publicity ..	18	8	0
Stationery ..	20	8	0
Tonga hire ..	2	11	0
Equipment ..	0	10	0
Bank Charges ..	4	0	6
General Charges ..	1	10	0
Total ..	225	3	0

Inspector, Co-operative.
Societies, Lahore City.

Dated: 19-12-36.

The Co-operative Department would conduct the next half yearly audit some time in the month of January or February, 1937. But with a view to acquaint the members of the Board with the exact financial aspect of the Board as on the 31st December, 1936 (which is however subject to regular audit by the Co-operative Department in due course) the following balance sheet is printed:

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Balance Sheet of the Punjab Provincial Co-operative Fruit Development Board as on 31-12-1936.

Liabilities.			
	Rs.	a.	p.
Subscription realised	5,567	7	0
Advances received on account of the advertisements in the Punjab Fruit Journal	52	0	0
Petty Cash bill payable	16	5	6
Cheque paid but not cashed	75	0	0
Establishment payable	75	0	0

Total .. 5,785 12 6

Assets.			
S.B. with P.B.	4,357	4	0
Current with P.B.	219	0	0
Current with Central Co-operative Bank, Lyallpur	481	13	9
Cash in hand with Asst. Secy.	15	0	0
Deficit as per Audited Statement of Accounts of the 8-6-1936	77	3	0
Deficit as per Audited Balance Sheet of 31-8-1936	208	12	3
Debit balance (loss) as per P & L. account attached	426	11	6

Total .. 5,785 12 6

Profit and Loss account of the Punjab P. C. Fruit Development Board from 1-9-36 to 31-12-36.

Profits	nil.
Debit balance (loss) carried to the balance sheet	426 11 0

Losses			
Establishment paid	225	0	0
Establishment payable	75	0	0
Postage	26	14	3
Stationery	20	10	9
T.A.	45	1	6
Printing	28	0	0
Petty Equipment	5	1	0
Bank Charges	0	8	0
Sundries	0	8	0

Total .. 426 11 6

(Sd.) K. L. KOHLI, M.A.,
Asstt. Secy., Punjab P.C.F.D., Board.

THE PUNJAB FRUIT JOURNAL

No. 2

LYALLPUR, APRIL 1937.

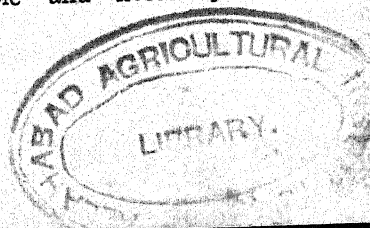
Vol. 1

FORMATION OF A FRUIT GROUP

With proper organisation and State patronage fruit industry should be able to provide bread not only to countless millions in the Punjab but considerably enrich the Provincial revenues. It will not be utopian to conceive that in this province out of the total cultivated area of three crore acres; at least one acre out of twenty can be under garden and every acre through judicious intensive cultivation, yielding an income of Rs. 100 to Rs. 500. This added with a network of hundreds of fruit preservation factories, canneries and bye-products plants scattered all over the fruit growing centres of the province, should make the progressive fruit-grower prosperous.

With the realism characteristic of his race, the Punjab Fruit Grower has become an ardent supporter of the Provincial Fruit Co-operative Movement and it can be safely predicted that the day is not distant when the Punjab Fruit Development Board will be reckoned as a force in the rural economy of the province. With a galaxy of public-men and officials, who compose the Executive of the Board, the Fruit Co-operative Movement can look ahead with confidence.

The stage has actually reached where the Fruit Development Board is contemplating to put into operation many constructive schemes for the development of the fruit industry. In the matter of the Fruit Journal alone, the necessity is becoming increasingly apparent to convert the journal into a monthly. The Managing Committee of the Board has further decided that a weekly fruit price-bulletin should be issued as a supplement and circulated free to all members. Another important scheme which has been exercising the mind of the Executive of the Board is the establishing of a proposed Central Fruit Market at Lahore. Equally important proposals have been receiving the attention of the Bud Selection Committee of the Board, which has worked out details of locating fruit trees of outstanding merit, with a view to multiplying the same by vegetative means for supply to members. This scheme, if properly operated, can have a marked influence on the fruit industry of the province. The space at our disposal is too short to mention several other no less vital schemes that are under consideration and which have been necessarily held in abeyance for lack of funds. These highly valuable and no doubt important beneficial schemes cannot be altogether abandoned. What is obviously called for is liberal patronage of the State supported by suitable and necessary legislation.



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Provincial autonomy has already been introduced in the province under the able leadership of the Hon'ble Major Sardar Sir Sikandar Hyat Khan to whom we extend our heartiest co-operation. It will not be extravagant to express the hope that the first autonomous Government of the Punjab will lend its powerful support to the Punjab Fruit Development Board and help it to accomplish its ambitious programme. We are, at the same time, equally confident that the opposition will also secure the maximum benefits for the Board. There are two very vital matters which should deserve the serious and sympathetic consideration of our new legislators as well as all those who are genuinely interested in the development of the fruit industry. The first is the formation of a "Fruit Group" in the Punjab Legislative Assembly which already includes many active leaders of the fruit movement like the Hon'ble Sir Shahab-ud-Din; K.B. Mian Ahmad Yar Khan Daultana; S.S. Ujjal Singh; S. Sampuran Singh; Mian Shah Nawaz Khan Nawab of Mamdot; Mahant Girdhari Dass; Mian Nur Ullah; Sirdar Mohammad Hussain and others.

S.S. Ujjal Singh, M.L.A., has fortunately been prevailed upon to initiate the matter and proceed with the organisation of the group. The second, which in fact is a paramount consideration for us, is the raising of the Punjab Fruit Development Board into a statutory body on the lines of the Indian Tea Cess Committee. To ensure the successful working of such a board it would be necessary to allocate annually a subsidy of Rs. 5,000 to Rs. 10,000. In this connection it would be of interest to know that the U.P. Fruit Development Board has been enjoying an annual grant of Rs. 4,000 from its very inception. New legislators moreover could be of immense use to the Board by securing legislation on several of the much needed aspects of the Fruit industry.

* * * * *

Members would be glad to know that as a result of an enquiry by the Honorary Secretary of the Board, the Chief Engineer, Irrigation in his letter No. 3688-Rev. dated the 16th March has intimated that rules re. 'Kharaba' remission as published in the Irrigation Branch Notification No. 7793-Rev. dated the 14th October 1936 "apply to the case of orchards as for other crops."

* * * * *

It has been suggested to us that in the interest of economy the English and the Urdu sections of the Journal should be separated; since some of the members prefer to receive the English Section only, while there are others who wish to be supplied with the Urdu Section alone. To enable the Board to arrive at a definite decision, members are requested to intimate their preference at their earliest convenience.

* * * * *

Annual subscriptions of several of the members of the Fruit Development Board have either expired or are about to do so. They are requested to renew their membership by sending an early remittance.

A. W.



**The Hon'ble R.B., Sir
Ch. CHHOTU RAM,
Minister for Development**

In welcoming our new vice-Patron we confidently hope that he would prove a champion of the interests for which the Fruit Development Board stands and with his pronounced and deep sympathies with the agriculturists for ameliorating their economic conditions he would prove a pillar of strength to the allied and important branch of agriculture—the fruit industry of the Punjab.



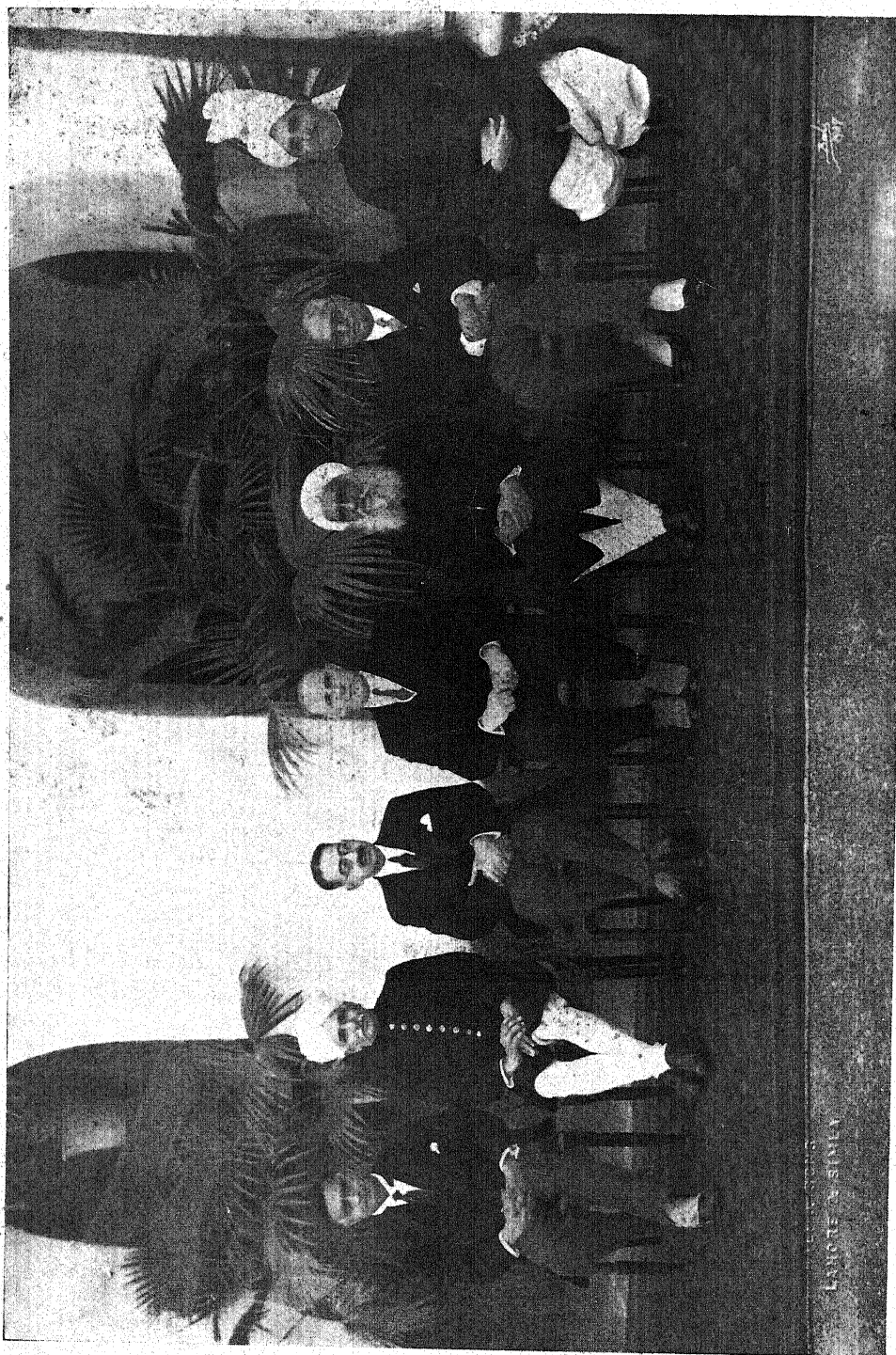
**H. E. SIR HERBERT EMERSON,
Governor of the Punjab**

As the Patron of the Board, H. E. deserves our gratitude for his most sympathetic support of fruit culture in the land of the five rivers and about whom it could truly be said that when the history of the fruit industry in the Punjab is written, his name will appear in letters of gold. Before he lays down the reign of his high office he will see the industry well-established.



**The Hon'ble Sir
JOGENDRA SINGH, Kt.**

In bidding farewell to our outgoing vice-patron we would like gratefully to acknowledge his unerring guidance and unbounded enthusiasm with which he helped to bring into existence the Fruit Development Board and keenly watched its progress.



THE PUNJAB CABINET

The Fruit Development Board extends its hearty congratulations to the new Cabinet and expresses the hope that the fruit industry in the province will enter upon a new era of prosperity and expansion under the new regime.

L. K. SINGH

CHRONICLE OF THE FRUIT WORLD

1. **Health Certificate Required for Imported Plants.** Messrs. Mackinnon Mackenzie and Company of Karachi inform us that according to the Government of India orders, plants imported after the 1st of February 1937 will not be passed through the customs if they are not accompanied by a certificate from suppliers stating that the plants are free from any disease. It will also be necessary for the suppliers to state what kind of plants are sent, as **importation of citrus plants is prohibited.**

2. **Marking Oranges and Grapes Draft Rules.** At last start has been made by putting into operation the recommendations of the Agricultural Marketing Advisory Department of the Government of India pertaining to marking and grading of fruit. The Government of India have taken legislation, in this connection, in hand and draft rules are reported to have been framed by the Governor-General-in-Council.

3. **Imports of Fresh Fruits and Fruit Products to India.** While Kulu apples and Punjab Malta oranges rot in the internal provincial market on account of lack of properly organised marketing conditions, Japanese apples, Jaffa oranges from Palestine and Sunkist oranges from California enjoy ready sales at the India ports. Figures relating to the huge quantities of fresh fruits, vegetables and fruit products imported during the year 1934-35 are now available and reproduced below which throw a flood of light on the situation making legislation imperative to check this menace of foreign competition.

	Rs.
Fresh fruits and vegetables	1,29,98,727
Canned or bottled fruits	10,90,804
Jams and Jellies	6,46,154
Pickles, chutnies, sauces and condiments	6,90,022
Vinegar excluding bottled vinegar	20,943
Dried Salted Fruits, etc	20,39,724
Raisins and currants	1,74,776
Dates	53,19,904
Other sorts	22,18,575
Total	<u>2,51,99,629</u>

4. **Increase in Production of Grapefruits in the Punjab.** Private advices from the fruit-growing members of the Board, indicate that the

experimental measure of increasing the Grapefruit acreage in their orchards is proving sufficiently successful both from cultural as well as from the commercial points of view.

5. **Indian Mangoes for Coronation.** Under general supervision of the Horticulturist, Bombay Government, a shipment of well-graded 2,000 mangoes has been made from Bombay to reach London market during the Coronation week.

6. **Developments in the Fruit Section (Agricultural Deptt., Punjab.** (a) Seven months' Advanced Fruit Preservation Course:—As a result of the ever increasing demand for trained service for the fruit preservation industry of the Punjab, the Department of Agriculture has started a seven months' Advanced course in Fruit Preservation from the 1st April, 1937. This season only seven scholars have been admitted; and the fees payable are Rs. 20 p.m. For imparting efficient teaching a special Canning Hall to be run on semi-commercial scale has been completed, and Dr. Siddapa, Ph.D., has been especially engaged as Assistant Lecturer under the Fruit Specialist, Punjab.

(b) Citrus Stock and Grape-hybridization Research. Horticultural Sub-Station, Montgomery, Punjab:—Dr. Sham Singh, Ph.D., (Bristol) who returned only in September last has been put in charge of the Research Experiment Station, though of course the work as heretofore will be conducted under the direct supervision of the Fruit Specialist.

(c) Dr. G. Lal Gazetted:—Dr. Girdhari Lal, Ph.D., (London), D.I.C., who contributes to this issue, has been elevated to a Gazetted position of Assistant Fruit Bio-Chemist under the Fruit Specialist.

(d) Progeny Gardens at Risalewalla, Lyallpur:—Taking into account the difficulty of obtaining sufficient amount of budwood of reliable varieties for propagation of nursery plants, the Department of Agriculture has begun planting an extensive orchard of its own at Risalewalla—a suburb of Lyallpur. Trees of only the best varieties will be planted. These will be used as parent trees for production of nursery plants on a vast scale for supply to the people at nominal prices.

INTERNATIONAL FRUIT WORLD:—

Imperial Fruit Show. The seventeenth annual Imperial Fruit Show and Cannery Exhibition will this year be housed in the Bingley Hall Birmingham, England, from October 19th to Thursday, October 28th, 1937.

Movies to the Service for Popularising Citrus. Recently two talkies have been reeled out for popularising California "Sunkist" citrus fruits. The names of the topic reels are (1) Sunkist Speaks, (2) New Fashions in Foods.

A Special Representative for Trans-Pacific Markets. California Fruit Exchange has recently employed a special representative for survey and sales-promotion work in trans-Pacific. It is an example, which the Fruit Development Board would do well to follow.

Progress of the Fruit Development Board. It was only a few months ago that the whole Province was astir with the election fever, and many of our important fruit growers were also engaged in the election campaign. It is, however, gratifying to note that in spite of this distraction the fruit Co-operative movement has been making a quiet, though steady, headway both at the centre as well as in the mofussil.

During this quarter the Managing Body of the Punjab Fruit Development Board met twice, while various Standing Committees held three meetings. In addition a number of conferences were held with the North Western Railway authorities and the new allies of the Board (Messrs. The Cold Storage Company of India Limited) who have promised to provide Cold Storage facilities at the intended Central Fruit Market at Lahore. A representative deputation of the Fruit Development Board also recently waited upon the Administrator, Lahore Municipality, in connection with the establishment of a proposed fruit market.

Wholesale Central Fruit Market. Tentative proposals for establishing a Central Fruit Market at Lahore were also discussed with the Deputy Commissioner of Lahore by the representatives of the Fruit Development Board on the 26th of April. Mr. Bourne promised to give a sympathetic consideration to the Board's request for organising a wholesale fruit market at the old fruit market site, outside Shahalmi Gate, Lahore; and gave an assurance that he would place the proposal before the local Government whose decision is now awaited.

Bud Selection Committee. The Board's Bud Selection Committee adopted some very useful proposals under which it should be possible to localise and eventually multiply the number of trees of outstanding merit throughout the province. The scheme devised by the Committee envisages the appointment of a supervisor and hopes that Government would meet the Board half-way by sharing the expenses.

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The scheme when materialised will help in raising the general standard of quality and quantity of fruits in the province.

The Punjab Fruit Journal. The first issue of the Journal has been highly appreciated both by the press and the public alike. The Journal has the good-will and sanction of the Department of Agriculture. All the district gazetted staff have been authorised to enrol themselves as subscribers of the Fruit Journal.

The Executive of the Board contemplates to implement the decision of the Managing Body in issuing weekly price bulletins as supplements to this Journal. The Marketing Officer, Punjab, has kindly consented to take up the work.

Fruit Development Board's Finances. The Hon'ble Sir Shahab-ud-Din, Speaker of the Punjab Legislative Assembly and President of the Fruit Development Board has agreed to lead a deputation to H. E. the Governor of the Punjab with a view to seeking his help as the patron of the Board in consolidating the Board's finances.

Nurpur Pathankot Fruit Growers' Association. The Association carried out this year spraying operations in the gardens of various members by the staff kindly provided by the Entomologist to Government Punjab. About 11,000 trees in all were treated against Citrus Psylla, Citrus Canker, Wither Tip and Mango Hopper in January and February.

The Fruit Specialist, Punjab, also kindly helped the Association with the services of a trained Mali, who did very useful work in many gardens in pruning and manuring of trees and budding of nursery stock.

(By K. L. KOHLI).

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DISTRICT AWAKENINGS

1. **PATHANKOT FRUIT GROWERS ASSOCIATION:**—Thanks to the efforts of Lala Mehar Chand Mahajan, Advocate, and K.S. Ch. Niaz Ali Khan of Jamalpur, the association has begun to take an active interest in furthering the cause of the fruit industry. It successfully organised a separate stall of its own in the recent provincial fruit show at Lahore, where it jointly displayed the fruits of its members in well classified manner in labelled packages of the Association. The Association has also held an annual meeting at which speeches were delivered by eminent authorities on horticulture and a number of resolutions were adopted furthering the cause of the Association. Among other achievements of the Association is the decision of Government to construct a pucca road from Pathankot to Indura. This is entirely due to the efforts of the Association when it succeeded in persuading the Hon'ble Sir Jogendra Singh, Minister for Agriculture, to attend the annual function of the Association and look into the needs of the fruit-growers.

2. **MAMOON ORCHARDS PATHANKOT ESTABLISHES A FRUIT JUICE FACTORY AT PATHANKOT:**—Mamoon orchards are establishing an up-to-date fruit juice factory at Pathankot, which will utilize the surplus fruits of Gurdaspur and Pathankot districts. It is learnt that the factory will be in operation this winter.

3. **HOSHIARPUR DISTRICT FRUIT GROWERS:**—The fruit growers of tehsil Garh Shanker have organised themselves into what is called the Garh Shanker Fruit Development Society. Ch. Ghulam Mustafa of Garh Shanker is to be congratulated on organising the body.

Mr. M. R. Sachdeva the popular Deputy Commissioner has recently issued a fervent appeal in consequence of the circular from the Hony. Secretary of the Provincial Board to all local bodies of the district that they should rightfully awaken themselves to the vast potentialities which the fruit industry offers in the district commonly known as "Garden of the Punjab."

4. **PLANS FOR MODEL MUNICIPAL FRUIT MARKET AT LYALLPUR:**—The Lyallpur Municipality is considering the proposal of organising a model municipal fruit market. The design of the market, it is reported, is the first of its kind in India. Besides provision for Cold Storage facilities, the plan contains adequate space for retail as well as wholesale marketing.

5. **KULU FRUIT GROWERS DEMAND CONSTRUCTION OF NEW PASSAGE:**—Taking into consideration the adamant attitude of the Mandi State in not improving transportation facilities between Baijnath and Mandi themselves or passing on the same to the Punjab Government to do the need-

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ful by placing the road in question at the disposal of the Public Works Deptt. of the Punjab Government on the plea of losing revenue, there is a move in responsible Kulu valley fruit growers circles to make a representation to the Punjab Government to construct a direct passage to Kulu and Baijnath via BABU PASS in the British territory.

6. GUJRAT FRUIT GROWERS UNITE:—It is gratifying to learn that as a result of special personal interest evinced by K.B. Khurshid Mohd., the Deputy Commissioner Gujrat, a local fruit growers association has been organised as an unregistered body for the present. ..

7. DERA GHAZI KHAN BECOMES FRUIT MINDED:—The fruit growers of Dera Ghazi Khan have also decided to participate in the fruit co-operative movement. To start with they have sent a contingent of about half a dozen members to the Provincial Board and local fruit growers association is also being organised under the patronage of the Deputy Commissioner.

8. THANK YOU:—Khan Bahadur Ahmad Hassan, who as Deputy Commissioner, Karnal had taken a leading part in furthering the cause of the Fruit Development Board has started to evince an equally keen interest on his transfer to Mianwali.

Our thanks are also due to many other Deputy Commissioners who have individually in their own districts helped to further the cause of fruit industry. In this connection we would like particularly to mention the names of K.B. Nur Mohammad D.C. Sheikhpura, Mr. P. N. Thapar, I.C.S., D.C. Montgomery; Mr. Stainton, D.C. Lyallpur, Mr. S. Partap, ex-D.C. Lahore; Mr. Moon, D.C., Multan; Mr. MacDonald, D.C. Amritsar; and Mr. Akhtar Husain, ex-D.C., Ferozepore.

(By K. L. KOHLI).

IT PAYS TO MANURE FRUIT WITH SULPHATE OF AMMONIA AND NICIFOS

Further information, prices, etc., can be obtained from I. C. I. travellers and distributors or direct from:-

IMPERIAL CHEMICAL INDUSTRIES (INDIA) LTD.,

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FRUIT-GROWING IN THE PUNJAB

—Being—

The Speech of Sir JOGENDRA SINGH
delivered at the Punjab Fruit Show
held at Lahore in January 1937.

In the course of his speech, Sir Jogendra Singh said:

The possibilities of fruit growing in the Punjab are immense. The new nurseries that have been established will be in a position to distribute plants of high yielding varieties at modest prices. The work in the Murree hills, I hope will be followed in Simla and Kangra also. It is possible that Salt Range may provide even almond orchards. Justice Bakshi Tek Chand, Mr. Mehar Chand Mahajan and Khan Sahib Ch. Niaz Ali Khan are growing oranges, liches and mangoes in foot hills and in Kangra valley itself Indura is promising to become the orange orchard of the Punjab. It is now clamouring for facilities of transport which I have promised to provide. If consumers had any purchasing power we have a domestic market, which could consume all that fruit growers could produce. India imports fresh and preserved fruits worth Rs. 2,36,04,425. Major General Sir McCarrison holds that deficiency in diet is responsible for inefficiency of our labour. H. E. the Viceroy had drawn pointed attention to this vital problem and we may well hope that the Finance Department of Government of India will turn its eyes, from problems of raising revenue to the need of developing resources from which revenue could flow as water from an artesian well. Provinces with their limited sources of revenue can do little without the co-operation of the Government of India.

Value of Mulberries

Col. McCay's investigations have led him to the conclusion that the protein factor determines the place of Indian races in the scale of physical efficiency. He traced all differences in physique to the different levels of nitrogenous interchange possible in the diet of wheat eaters and the diet of rice eaters.

"The people of Hunza," says Major General R. McCarrison, "make less use of meat than either the Sikhs or the Pathans. They are, however, great fruit eaters, specially of apricots and mulberries. These people are unsurpassed by any Indian race in perfection of physique; they are longlived, vigorous in youth and age, capable of great endurance and enjoy remarkable freedom from disease in general."

It is clear from what these authorities say that more fruit people eat, the greater is their capacity for work and enjoyment of health and happiness.

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It is true extension of fruit growing in the plains is limited by facilities of irrigation. I am hoping that if Tubewell Irrigation supplements Canal Irrigation this limitation will disappear. From July to September there is abundant supply in our rivers and there is no reason why this supply should not be usefully employed. In winter orchards require watering only once a month or so. Where canal supply is not available in winter, it could be supplemented by raising subsoil water.

Canned Fruits

"There are great prospects for canned fruits and vegetables in the United Kingdom market if the canning is done according to up-to-date methods and the containers bear attractively coloured labels, says the Trade Commission." The only canned goods so far received from India are the mangoes, guavas and lichies, supplies of which are irregular and suffer from the drawback of bad selection. There is also much scope for improvement in the canning. There is no doubt that for the more rapid expansion of the fruit and vegetable trade from India she must seriously consider the question of developing the canning industry. Is there any reason why we should not aim at capturing this market.

From my long experience in agriculture, I know that what the peasant with his small holding needs is a money crop, so that he could pay all his money demands by growing fruit and other money crops and keep the cereals to himself.

In conclusion, I wish to congratulate all those who have won prizes and to urge them to continue to improve their orchards. The Provincial Co-operative Fruit Development Board has secured 400 members already and I hope fruit growers all over the province will join the Board and thus reap the reward of associated efforts in pooling their experience and their resources and in marketing their produce. It must be our ambition that our Province should take the first place in fruit growing and fruit preservation in India."

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Allahabad	Gujranwala	Jhelum	Moga	Saharanpore
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Ambala City	Hafizabad	Karachi	Multan City	Sialkot City
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FRUIT INDUSTRY

A Review of Recent Developments

—Being—

The speech by H. R. Stewart, Esquire, I.A.S., Director of Agriculture, Punjab, on the occasion of the prize distribution at the Punjab Fruit Show, 1936-37, the Hon'ble Sir Jogindra Singh, Minister for Agriculture, presiding.

Five years have elapsed since you, Sir, presided at the distribution of prizes in connection with this Fruit Show. These years have been eventful in the history of agriculture in this province, but in no direction have they been more so than in relation to the fruit industry.

Time does not permit of a review here of the various stages in the development of the fruit industry in recent years. Mention can be made only of the directions in which progress has been made during the past year and of the lines on which activities are being directed.

The demand for reliable fruit nursery plants has continued to increase. Last year the Fruit Section received from the Government of India's Rural Reconstruction grant funds to meet the cost of extending the Department's fruit nursery work. Consequently, various nurseries throughout the Province have been enlarged and additional nurseries have been established during the last year. The effect of this expansion on the supply of plants cannot be felt just yet, but by next financial year the aim is to supply about 25,000 plants at reasonable rates from the Lyallpur nurseries and an equal number from all the other nurseries combined.

One of the greatest difficulties in the way of increasing the production of reliable nursery plants has been the supply of good budwood in sufficient quantity. This trouble is being solved by the establishment at Lyallpur of a progeny garden which will be planted entirely with trees of outstanding merit for the sole purpose of supplying budwood.

The future successful development of the citrus fruit industry in the Punjab and the possibilities of this fruit obtaining a footing on the foreign market depend not only on the production of fruit in sufficient quantity but on uniform quality and grade. To produce such fruit the standardisation of the root stock on which the various varieties are budded is one of the most important factors, for it is well-known that the quality and yield of fruit, the longevity of trees and their resistance to disease are influenced by the stock used. For the investigation of this problem a grant

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has been received from the Imperial Council of Agricultural Research and an experimental fruit orchard devoted to this problem is now in process of establishment at Montgomery. Under the same scheme facilities have been provided to enable investigations to be carried out on the improvement of grapes in the Punjab. Experiments up-to-date have shown that certain varieties of grapes do well in the province. Some of them are very early ripeners whose fruit matures before the rains set in, but several varieties which grow well are unable to mature their fruit before the rains. It is hoped to combine the heavy bearing and good quality characters of these varieties with the early maturity of some less prolific strains, with a view to evolving really suitable varieties for the Province.

Another important problem which is about to be investigated is the **San Jose Scale** insect pest of fruit. In certain other fruit countries of the world this pest has wrought havoc and it is essential that it should not be allowed to continue unchecked here.

Very important and useful results have been obtained during the year in the research into the preparation of fruit products. During this period formulae have been worked out for the preparation of various products, such as ketchups, juices, squashes and preserves. Many of these preparations are on exhibition here and it is safe to assert that most people will find them at least equal in quality to the corresponding imported articles and probably much cheaper.

Further developments have been made during the year in the instruction given to the public in fruit culture and fruit preservation. The usual short courses in both these subjects have been given at Lyallpur and elsewhere. At the former the number of applications increased to 226 this year and included graduates and men from as far afield as at Assam. At Muzaffargarh 67 were admitted to the fruit culture course as against 34 in the previous year. The facilities provided a year ago for the one year's course for training fruit 'malis' soon proved inadequate and recently these facilities have been doubled and 30 men are now being trained annually as 'malis.'

At the request of the Co-operative Department a special short course in fruit preservation was held during the year for Sub-Inspectresses and non-official female workers of co-operative societies. This course was a new departure but, judged by its popularity, it seems likely that it may be repeated and it is hoped extended to female teachers in other Departments. Such a course of training should prove useful for those

THE PUNJAB FRUIT JOURNAL

ladies of the Education Department who teach domestic economy under the name 'Khanadari,' as they could then introduce fruit preservation as a subject in girls' schools.

For several years now short courses in fruit preservation of from two to three weeks' duration have been held with the object of creating an awakening as to the possibilities of this industry and of popularising the preservation of fruits and vegetables and the manufacture of fruit products on a small scale for home consumption. These objects have been amply realised as is shown by the very large number of applications for admission to these courses received not only from the Punjab but from outside. People are, however, coming forward now with a demand for special training in this branch with a view to start business on a commercial scale. For such people the present short courses are inadequate. Funds have, therefore, been provided by Government from the Rural Reconstruction grant for the erection and equipment of a fruit canning laboratory at Lyallpur on semi-commercial scale. This laboratory will not only be used for experimental purposes but will provide the means of giving an extensive course on fruit preservation to those desirous of taking up this subject as a business. No centre exists in India at present where such training can be obtained. The provision of such facilities marks a very important step forward in connection with the fruit industry. It is proposed to begin a seven months' course of instruction in March next.

Of equally great importance to the fruit industry of the Province is the proposal for the provision of adequate cold storage in Lahore and other centres in the Province. If the season over which various fruits are marketable at present could be extended and the fruit could be preserved from deterioration by cold storage, greatly increased profits would result to the grower. The problem of providing such cold storage in the Punjab has often been considered and it is very gratifying that there is now a definite certainty of such storage being erected in Lahore and elsewhere in the Province at a very early date. In the meantime, during the last year some cold storage experiments with Punjab maltas have been carried out and preliminary information has been collected as to the effect of storing maltas at varying temperatures for periods of different lengths.

The staff provided for fruit marketing investigations under the larger scheme of marketing all agricultural products, financed largely by the Imperial Council of Agricultural Research, has continued its investigations during the year according to the All-India programme. Marketing surveys on a large number of fruits have been completed. Detailed information relating to various phases of marketing has been collected and the

THE PUNJAB FRUIT JOURNAL

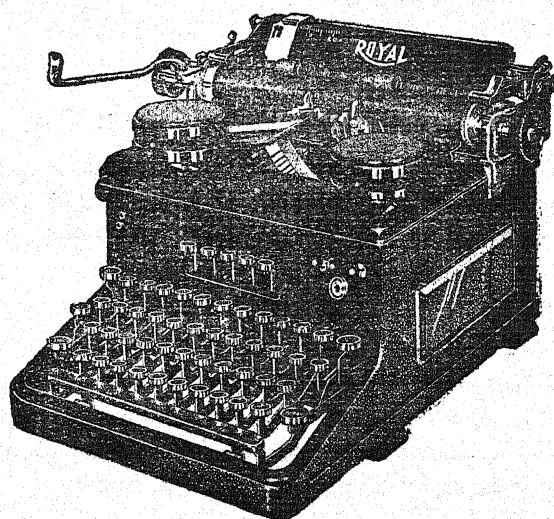
reports are now being compiled with those of other provinces by the central staff in Delhi, so as to form an All-India report, on which future policy for the improvement of fruit marketing will be based.

The Punjab Provincial Co-operative Fruit Development Board has been active during what was really its first year of existence. The subscribing membership of the Board, which is now about 400, is steadily increasing. One of the Board's chief achievements has been the starting of a bi-lingual magazine named the 'Punjab Fruit Journal' for the dissemination of horticultural knowledge. The first number of this magazine has just issued. The Board is also actively engaged at present in finding a site on which to open a provincial co-operative wholesale fruit market. It is hoped that such a market will be soon in actual operation and it is sure to have a far reaching effect on the fruit industry in the Province.

For several years the Provincial Fruit Show of Lahore has been the only opportunity which growers have had of displaying their produce and bringing it to the notice of the public. During the past year, however, in response to numerous requests and suggestions on the part of fruit growers shows have been held during the summer months for certain other fruits, such as mangoes and dates in the plains and cold region fruits in the hills. Very successful shows of the former were held at Multan, Jullundur and Karnal (the last named by the District Fruit Growers' Association) whilst a show of hill fruits held in Simla September last attracted very considerable notice.

The interest taken in the Show by District Boards continues unabated and acknowledgement is due of sums totalling Rs. 595 from the District Boards of Gujrat, Ludhiana, Jhang, Lahore, Muzaffargarh, Montgomery, Lyallpur, Amritsar, Sheikhpura, Hoshiarpur, Gurdaspur and Jullundur, as additional prize money for competition limited to exhibitors from within their own boundaries. The number of District Boards making such contributions becomes greater every year and these additional prizes are very much appreciated by exhibitors.

Lastly, Sir, I desire on behalf of the Department to express to you our great appreciation of your having consented to distribute the prizes once more. In the steady progress which has been achieved in connection with the fruit industry during the last ten years you have taken a prominent part, not the least of which was in finding the wherewithal necessary for furthering the work. We know that in the future your interest will continue unabated and we look forward to your constant help, whether in an official capacity or as a citizen, who has the welfare of the cultivator and of the Province so much at heart.



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SEASONAL HINTS

—By—

S. S. S. LAL SINGH, Fruit Specialist, Punjab.

In the last issue of the Fruit Journal seasonal hints on the improvement of old gardens and establishment of new gardens were given. The next issue of the journal will be out in July in which hints will be given on the propagation of nursery plants and planting of trees in the Monsoon. From now, until July, there is not much for the growers to do but they would do well in giving attention to the following matters:—

1. **Bers** are already ripe and would soon be over. Some varieties of peaches, plums, phalsas, mangoes and grapes would also ripen before July. The fruit growers would do well in marking trees that are bearing the heaviest crop and the fruit of high quality. They should not trust their memories but they should mark these trees with coal-tar, and also note down in the register the exact location of such trees so that they are utilised as parent trees for further propagation of nursery plants. The importance of this work can hardly be over-emphasised when we consider that 90 per cent of our fruit trees are either poor-yielders or bear fruit of low quality and fruit gardening will be profitable only if in future, nursery trees are propagated with budwood from trees of outstanding merit.

2. **Duststorms** and hot dry winds would be common during these months. The growers should observe which varieties of fruits easily shed their fruits. They should also see to what extent thickly planted tall trees all around the garden (which serve as wind-break to minimise the destructive effect of storm) prove useful. The duststorm that occurred a few days back, did immense damage to the trees and fruits in those gardens which were exposed on all sides, while other fruit gardens which were protected on all sides by windbreaks escaped this calamity to a considerable extent. Leaflet on windbreak issued by the Department of Agriculture should be carefully studied. Bracing the branches of the trees helps them considerably to withstand the storm.

3. Main application of farm yard manure and fertilisers has already been given by the growers in January-February. In the case of very weak trees or trees that are heavily laden with fruits, the growers are advised to apply a small doze of ammonium sulphate which should be mixed with soil and spread evenly around the trees and hoed into the ground. For full grown malta or sangtara trees about a seer of ammonium sulphate per tree should do.

4. During this hot dry period the necessity of regular application of water—say once every ten days or so,—followed by hoeing and complete removal of weeds, at least from the basins of the trees (basins to be as wide as the spread of the branches) cannot be over-emphasised. It may be stressed that even a fortnightly irrigation followed by hoeing and eradication of weeds may prove more useful than even a weekly irrigation which is not followed by hoeing and when weeds are allowed to flourish. The weeds not only compete with the roots of the trees for plant food material but also transpire tremendous amount of moisture from the soil through their leaves.

5. There is no better method to keep diseases under control than to constantly go on removing the diseased branches of trees and burning the same. The usual practice of ignorant fruit growers of throwing the diseased fruits or branches on the ground is to be highly deprecated. All diseased wormy fruits and branches should be carefully collected and burnt.

6. In the case of trees (whether young or old) whose trunks are exposed to direct rays of sun, there is always a danger of the bark getting sun-burnt. The bark when sun-burnt, cracks and dries up with the result that trees cease to grow further. White-washing the trunks of trees or wrapping the same with gunny bags, paper, or even straw, are effective methods in protecting trees against sun-burn. For detailed instructions reference should be made to Department of Agriculture leaflet on sun-burn.

7. The usual practice of either pulling the fruit from the branches of trees or picking the same with a long piece of stalk (sometimes with leaves attached to the stock) is to be condemned. Complete removal of stalk from the fruit causes a hole at the stalk-end thus providing entry for disease germs but long stalk if attached to the fruit would puncture the skin of other fruits in packing boxes. The best course is to clip the fruit with scissors in such a way that the stalk portion is in level with the surface of the fruit.

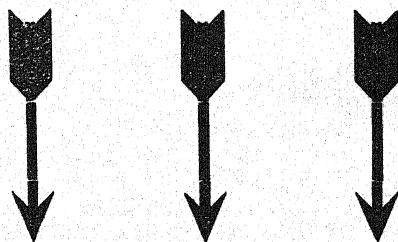
8. In case of fruit trees like peaches, plums, mangoes, etc., which ripen their fruit in summer and especially when there is a shortage of farm yard manure, it is a good practice to sow 'guara' in the garden and bury it in the soil to serve as green manure. In the case of citrus trees, however, green manuring with 'guara' has not proved beneficial because its period of active growth coincides with the period of active development of fruits on the trees. In the case of citrus trees it seems better to grow some 'rabi' leguminous crops in winter for the purpose of green manuring.

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ROOT STOCKS FOR CITRUS FRUITS

—By—

S. BAL SINGH, B.Sc. (Agr.) Punjab, M.Sc. (California),
Assistant Fruit Specialist.

In the first issue of the Fruit Journal (Vol. 1, January 1937, No. 1) Dr. Sham Singh had contributed an article under the heading "Recent tendencies in the Fruit Research work in the Punjab" in which he pointed out the importance of the part played by the mutual reactions of the stock and scion and described what the Agricultural Department proposes to do in solving the problem of stocks for citrus fruits such as Malta Common, Malta Blood Red, Sangtra and Grape Fruit. At present, in the Punjab, Malts are usually budded or grafted on different stocks like Khatta, Mitha, Mokari, etc., but there is no authentic data based on experiments to show the superiority of one stock over others.

Experimental work carried out in this direction in other horticulturally advanced countries also emphasises the importance of this work. It is generally recognised that a good stock must make a good union with the scion at the point of budding or grafting, give a fruit tree of desirable size, produce fruit of good quality, should be resistant to diseases and above all should be adapted to the soil and environmental conditions prevailing in the locality where it is to be planted.

As the climatic and soil factors are variable in different countries, the results obtained in one country cannot be applied with any certainty in another. The sour orange (kimb) has been the most prevalent stock in countries like California, Florida, Spain, Italy, Palestine and West Indies but for some unknown reasons it has proved an utter failure in South Africa, for the trees budded on this stock remained dwarf and sickly and failed to bear fruit. In California lemons were formerly propagated on sweet orange (malta) but its use as stock was abandoned because it proved to be very susceptible to gummosis. The growers began to use sour orange stock for lemons as it is practically immune to gummosis and other bark diseases. This also did not prove to be an ideal stock, as the lemon trees on this stock after 30 years showed marked decline in yield, which is now attributed to lack of congeniality between the lemon scion and the sour orange stock. The growers are now reverting to the use of sweet orange stock for lemons, as they have now understood the bark diseases and their control better

than they did 30 years ago. Thus it will be seen that a stock may give evidence of being suitable for a particular fruit for some time, but after certain years of good behaviour may prove to be unsuitable. This instance also points out clearly that stock experiments must be conducted over a long period to yield conclusive results.

Some of the reactions of different citrus stocks tried in various countries are given below for the information of the readers.

(1) **Rough Lemon** (*Citrus limonia*).—The rough lemon is the most common stock in South Africa for oranges, lemons, and grape fruit. It is known to form good union with the scion, and trees on it live long and yield heavily. It is known to adapt to many types of soil. It also possesses some resistance to bark diseases. But it has a few drawbacks in the sense that fruit produced on it in the early bearing years, is coarse and of somewhat inferior quality. This defect no doubt disappears after 4-5 years of fruiting and fruit is of high quality on fully matured trees.

This stock is also the most prevalent stock in India. It is known under different names in different provinces of India. In our Province it is known as "khatti" while it is called "Jamberi" in Bombay presidency. In hilly tracts it is called "Gamberi" or "Ghamberi."

Robertson Brown (Bull No: 93—The orange: A trial of stocks at Peshawar. 1920) also found Rough lemon giving the greatest vigour and fruitfulness to the Malta oranges but quite an unsuitable stock for sangtara.

(2) **Sweet orange** (*Citrus sinensis*).—Sweet orange (known as Malta orange in India) has been used as stock in California in the early stages of the citrus industry, but later on it was abandoned because of its susceptibility to collar rot and gummosis. Its good points were (a) good union, (b) vigour, (c) heavy bearing, (d) high quality of the fruit from the very beginning and finer texture than the fruit produced on trees budded on rough lemon. As far as the writer is aware, this stock has never been used anywhere in India.

(3) **Sour orange** (*Citrus aurantium*).—The sour orange is known in most places in the Punjab as "Kimb." Some people also call it "Khatta." But in other countries it is known as Seville and sour Florida. It is very widely used and is a most popular stock in Florida, California,

Palestine, Spain, Italy and South America mainly, as already stated above, due to its great resistance to root and bark diseases. It gives vigorous, healthy and productive trees, but as mentioned above many lemon orchards on this stock planted 20-30 years ago in California have shown a marked decline in yield and growers are consequently again reverting to the use of sweet orange (Malta Orange) stock. It is really very surprising that sour orange which has been so popular a stock in other countries was found unsuitable in Robertson Brown's experiments referred to above. In the Punjab it is used only rarely by some nurserymen.

(4) **Sweet Lime.** (*Citrus Aurantifolia*). It is known in the Punjab by the name of "Mitha." It is a suitable stock for Malta orange where a dwarf tree with fruit of high quality is required. The yield is low as compared to the rough lemon ("Khatti" the so far most popular stock in the Punjab) and hence mitha is considered rather unsuitable stock for commercial orchards. Of course it proved to be the best stock for Sangtras in Robertson Brown's experiment and was found to impart vigour to Sangtra scion and bore abundant crop of high quality fruit.

(5) **Mokari.** (*Citrus medica*). It is the citron of Commerce. It is also known as Turanj in some places in the Punjab. It is a worthless stock and bears fruit of inferior quality. It is a favourite with fraudulent nurserymen as this gives buddable stock in a shorter time. Prospective fruit grower Robertson Brown's experiments and was found to impart vigour to Sangtra scion always get plants from a reliable source of known reputation.

(6) **Trifoliate Orange.** (*Poncirus trifoliate*). Of all the citrus stocks, it is the only one which is deciduous in habit and is very resistant to cold. It is popular stock in China and Japan and is also extensively used in the Gulf States of America for Satsuma oranges. Fruit produced on this stock is of high quality and of fine texture. It is almost unknown to our nurserymen in the Punjab. *in fact India*

BUDDING SEASON OF CITRUS TREES

Some Practical Hints

—By—

S. S. S. LAL SINGH, Fruit Specialist, Punjab, Lyallpur.

Budding of citrus (malta, sangtara, etc.) is usually done in the beginning of the spring season as soon as the sap begins to flow. The actual period may vary slightly from place to place, but as a rule the stock seedlings become ready to receive "buds" by the 3rd week of February if cultural operations have been satisfactory and late frosts have not occurred. In the latter case budding may be delayed by a week or so. The growth of the "Frosted" seedlings may be accelerated by the application of quickly available nitrogenous fertilisers like ammonium sulphate in order that the budding may not be unduly delayed. There are little chances of rain at this time, and the budding done ordinarily with the "T" shaped incision and wrapped with "san" fibre or raffia results in a good percentage of "take of buds."

On the other hand, budding can be done with the same amount of success during the rainy season also, viz., months of August and September. But it is necessary that proper precautions should be taken to ward off the entry of moisture at the place where buds are inserted. This can be effected by the adoption of the following methods in nursery practice:—

- ✓ (1) The incision should be inverted "T"-shaped like "⊥" so that the chances of entry of the rain water sliding down the stem of the seedlings into the incision of the bark are lessened.

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- (2) If "waxed tape" is used for wrapping the inserted buds instead of "san" fibre, the danger of the rain water getting into the incision will be greatly avoided.
- (3) In addition to the first two precautions noted above, an additional precaution is the tying of a piece of butter paper a little above the budded point by means of a thread. It is particularly useful in case the rains come before the buds have started growing.

Sometimes it so happens that citrus trees (scion) start growing much ahead of the time the stock seedlings become fit for budding. Under such circumstances the bud sticks have to be gathered from the scion varieties and kept in storage for a few days. The ends of such bud sticks should be waxed and made into bundles before these are stored in moist sand or moss grass. The box containing moist sand or moss grass should invariably be kept under shade with a lid on it. Though this precaution is to be taken under circumstances, yet it should always be remembered that fresh bud wood invariably gives the best results.

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FRUIT PRESERVATION INDUSTRY IN THE PUNJAB

—By—

S. S. S. LAL SINGH, Fruit Specialist, Punjab, Lyallpur.

It is almost axiomatic to say that Fruit Preservation is indispensable for the proper development of fruit industry. Even in a well managed garden there is always a certain proportion of fruit that is unfit for sale in the market. This fruit, unless utilised for some by-product, must either go to waste or come in competition with first grade fruit or be mixed with good fruit and detract from its quality. It is extremely necessary that only first class fruit should find way to the fresh market—both local and foreign, and the unsaleable fruit be utilized for making products like Jams, Jellies, Marmalades, Juices, Vinegar, etc., etc. It is well-known that certain fruits and vegetables are available on very cheap rates for a short time when in season but these again when out of season, command very high prices. Preservation achieves two-fold advantage. It takes away the surplus stock from the market and makes it available to the public for a longer period than would be possible otherwise. Thus it is definitely in the interest of both the grower and the consumer.

To most of us the conception of fruit preservation is nothing more than the preparation of **Chutnies**, Pickles and **Marabba** which no doubt have been prepared for centuries in almost every country including India. But fruit preservation in the real sense is relatively a modern art. This modern industry which, until a few years back was almost unknown in the Punjab, has taken tremendous strides towards progress in other countries. For instance California State alone, one of the 48 States of U. S. A. and with a population of only about 25 per cent of the Punjab, canned in 1927 about 15 crore rupees worth of food. Our country for its supply of preserved products, depends almost entirely on foreign manufacturers and it imports every year a very large quantity of dried, salted and preserved fruits. With such potentialities as are already existing in our country, viz., abundance of raw material and cheap labour it should be possible to develop this industry to such an extent as to meet our own demand and also in due course to be able to export products to foreign markets. These articles if manufactured locally can be marketed at a fairly low price as compared with the foreign products.

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To create an awakening amongst the people about the possibilities of this industry in the Punjab, work in this line was started at Lyallpur a few year back. Two weeks' short course was also started to popularise fruit preservation on home sale. So far due to paucity of funds and inadequacy of the staff, etc., the fruit section at Lyallpur lacked reasonable facilities for carrying out researches in this line and also providing advanced technical training on the subject for commercial production. It is, however, gratifying to record that with the aid of special grants received from the Imperial Council of Agricultural Research, and the Government of India (Rural Development Grant) as well as from the Punjab Government, it has been possible to extend this work, including the erection of a small modern cannery at Lyallpur. A good deal of research work on the methods of preparation and standardisation of various products like fruit juice squashes, cordials, jams, preserved fruits and tomato products is well under way. As the products are standardised leaflets in popular language, are issued from time to time.

It will be of interest to mention here that articles dealing with the preparation of products like squashes, juices, tomato sauce, candying, vinegar, etc., are hoped to be published in this journal from time to time. Attention may here be invited to a very useful article on the subject appearing elsewhere in this issue. If the instructions are followed carefully it should not be difficult to prepare a really good product. On the occasion of the last Provincial Fruit Show, an exhibitor of lemon squash who had prepared the product by merely reading our instructions was awarded a first prize, his product having been considered excellent by the Judges. Manufacture of lemon and orange squash is also being carried out on a commercial scale by several firms to an extent of couple of lakhs of bottles a year. It is hoped that within the next decade, fruit juice industry alone will occupy a prominent place in this province and fifteen to twenty lakh rupees worth of fruit juice may be placed in the market every year.

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PREPARATION AND PRESERVATION OF CITRUS FRUIT SQUASHES AND CORDIALS

—By—

Dr. GIRDHARI LALL, Ph.D. (London), D.I.C.,
Assistant Fruit Bio-Chemist, Lyallpur.

With the recent development of fruit farming in the Punjab, it is now recognised that this Industry—Citrus Fruit Industry in particular—is one of the future leading industries of this Province. At the moment, it is not possible to give exact figures to represent the tonnage of citrus fruits available in the Punjab markets, but certain it is that large quantities of citrus fruits of all kinds—*galgais* (lemons) in particular—go to waste for a variety of reasons, in the Pathankote-Kangra tract each year. This fruit while converted into more stable and permanent products like squashes, cordials, essential oils, etc., could afford satisfactory profits both to the grower and manufacturer. Fruit growers all over the province, due to lack of proper marketing organisation and transport facilities, are able to dispose of their fruits at very diminutive profits (which are decreasing day by day), yet there is fair proportion of fresh fruit which is practically unsaleable (fetches very poor price if at all) on account of its size and condition, viz., undersized, malformed, blemished 'cull' fruit. All this, coupled with recent invasion of the Indian market by Citrus fruits from California, South Africa, Italy and other foreign countries renders the problem of profitable disposal of fresh indigenous fruits more acute. This problem will become acuter still as the production increases particularly when large acreages of citrus have yet to come into bearing. It is, therefore, believed that marketing of citrus fruits in the form of fruit juice squashes and cordials, for which there is already a good deal of demand in the Indian market, will afford a promising outlet for much of the surplus fruit both present and impending.

Citrus fruit juices are rich in vitamin C, the antiscorbutic vitamin, and vitamin A valuable for growing children, in combating colds, influenza, etc. They have additional therapeutic recommendations—citric acid preserves the alkaline balance of the blood and is found in citrus fruits. Hence the dietetic value of these real fruit juice beverages represent chief advantage over similarly named synthetic products which are being produced in such

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large quantities by the aerated water factories in this country. It would appear that with the aid of fruit products industry it should be possible for aerated water bottlers to place in the market successfully a line of real fruit beverages. A good start could be made with citrus fruit squashes and cordials, as they are inexpensive. It would seem evident that some form of publicity in which the dietetic importance of such beverages will have special prominence, will be necessary preliminary to their widespread consumption.

Citrus juices can be dispensed in the following manner:—

1. Fresh juice—served direct from the extractor.
2. Canned juices—natural juices—canned immediately after extraction.
3. Sweetened juice—squashes and cordials.
4. Carbonated bottled.
5. Citrus concentrates.

With the abundance of citrus crop particularly oranges, dispensing stands for fresh orange juice have lately come into existence in the large towns in India and the demand for fresh juice is certainly increasing; but the demand for such fruit beverages is more acute in summer months when practically no fresh citrus fruits except sour limes (**Kaghzi Nimboo**), are available. Hence the need for preserved sweetened juices (ready made for service) like squashes and cordials can hardly be over-emphasized.

The following methods for the preparation of orange, lemon, lime squash, and lime juice and lemon cordial have been evolved on the basis of experiments conducted at Lyallpur during winters of 1934-35 and 1935-36, and are given separately for each product. Technical details in arriving at these recipes have been omitted.

1. Preparation of lemon squash

Step I. Take fully ripe lemons or sour limes, (**Kaghzi Nimboo**), wash thoroughly, and cut the fruit into halves. Extract the juice from the cut fruit with a revolving cone extractor in the case of lemons and with a lemon squeezer in the case of limes (**Kaghzi Nimboo**). Strain the juice through a thick cloth and collect it in a non-corrodible vessel (an enamelled pan would do).

Note:—For work on a larger scale, lemon cutting and pressing machines can be obtained.

Step II. For making squash of medium (about 45° Balling) and

high (about 65° Balling) sugar content, weigh out the following amounts of juice, sugar and water:—

(i) Squash with medium sugar content:—

Juice	...	...	1.0	lb.
Sugar	...	...	1¾	lb.
Water	...	...	1½	lb.

(ii) Squash with high sugar content:—

Juice	...	...	1.0	lb.
Sugar	...	...	2¾	lb.
Water	...	...	6	Oz.

Step III. Mix the above amounts of juice, sugar and water. Stir till thoroughly mixed. In step II (ii) heat the mixture to about 120—130F for dissolving sugar. Add about one ounce of potassium meta-bisulphate per 100 lb. of squash—this is equivalent to about 350 parts of sulphur dioxide per million parts of squash. Potassium meta-bisulphite in the above-mentioned dose is a non-injurious chemical, use of which is permissible under Food Laws.

Note:—In the case of lemons, thoroughly ground and strained peel of 2 to 4 per cent of fruits used for juice extraction may be added to improve the flavour and aroma of the product.

Step IV. Pour the squash into sterilised bottles, (i.e., which have been boiled previously in water for half an hour) after adding a small amount of freshly extracted juice sacs. Seal air-tight using sterilised corks. Store the bottles in cool and dry places.

Note:—Lemon squash can also be preserved by pasteurisation, i.e., by heating the bottles in water at 175F to 180F for half an hour. By this process the quality of the product is somewhat impaired and the squash must be consumed within 3-4 days after opening the bottles, while this is not the case with product preserved with potassium meta-bisulphite.

2. Preparation of Orange (Malta) Squash

Step I. Take fully ripe oranges (malta), wash thoroughly and cut the fruit into halves. Extract the juice from the cut fruits with a juice extractor (a revolving cone) made of non-corrodible metal or hard wood. Strain the juice through a thick cloth and collect it in a non-corrodible

vessel (an enamelled pan would do).

Note:—For extracting the juice on a large scale, desired number of electrically driven cones or scoops can be obtained.

Step II. For making squash of medium (about 45° Balling) and high (about 65° Balling) sugar content, weigh out the following amounts of juice, sugar and citric acid. (As the natural orange juice contains only a small amount of acid (about 0.8%), citric acid is added to get the desired sugar-acid blend in the finished product, otherwise the palatability and briskness of the diluted squash will suffer considerably).

(i) Squash with medium sugar content:—

Juice	...	...	10	lbs.
Sugar	...	...	7	lbs.
Citric Acid	...	...	3	Oz.

(ii) Squash with high sugar content:—

Juice	...	...	10	lbs.
Sugar	...	...	15½	lbs.
Citric Acid	...	...	7	Oz.

Step III. Mix the above amounts of juice, sugar and acid, and follow the instructions given in step III (Preparation of Lemon Squash).

Step IV. Take peel of 2 to 4 oranges (malta) for every 100 maltas used for juice extraction. Thoroughly grind it and strain through a thick cloth. Add the strained peel emulsion to the product as obtained in step III.

Step V. Pour the squash into sterilized bottles (i.e. which have been boiled previously in water for half an hour) after adding a small amount of freshly extracted juice sacs. Seal air-tight using sterilized corks. Store the bottles in a cool and dry place.

The same as 'note' under Step IV (Preparation of Lemon Squash).

3. Preparation of Lime Juice and Lemon Cordial

Step I. The same as Step I for the Preparation of Lemon Squash.

Step II. Add potassium meta-bisulphite—about one ounce per 100 lbs. of juice (i.e., about 700 parts per million which is equivalent to about 350 parts of sulphur dioxide per million). Add 3—5 parts of

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Kaolin (a clay) per 100 parts of juice. Store the juice treated as above in a cool dry place. By this treatment the suspended matter settles down in about a month's time and a clear sparkling juice is obtained.

Note.—Use glass carboys or wooden barrels for storing larger amounts of juice.

Step III. Carefully separate the clear juice from the sediment and for making cordial of medium (about 35° Balling) and high (about 55° B) sugar content, weigh out the following amounts of juice, sugar and water:

(i) Cordial with medium sugar content:—

Juice	...	...	1.0 lb.
Sugar	...	...	1¼ lb.
Water	...	...	1½ lb.

(ii) Cordial with high sugar content:—

Juice	...	...	1.0 lb.
Sugar	...	...	2.0 lb.
Water	...	...	¾ lb.

Step IV. Mix the above amounts of juice, sugar and water. Stir till thoroughly mixed. In step III (ii) heat the mixture to about 130°F for dissolving sugar. Add appropriate amount of potassium meta-bisulphite (at the rate given in Step II) for the additional weight of sugar and water added.

Step V. Pour the cordial in sterilized bottles (i.e. bottles which have been previously boiled in water for half an hour) and seal them air-tight using sterilised corks. Store the product in a cool and dry place.

The above methods were developed under a scheme of research on the preservation of fruits and vegetables which has been financed by the Imperial Council of Agricultural Research. Any further information on the subject can be obtained from the Fruit Specialist Punjab, Lyallpur.

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PRINCIPAL OBJECTS:—The Company will set up an up-to-date factory near Lahore, under a highly qualified expert for the purpose of canning and preserving fruits and vegetables, and making of all sorts of other fruit products and by-products.

Note: Arrangements in this connection are in progress and the Company expects to place everything in working order at an early date.

PROSPECTS:—The prospects of this industry can be best understood from the fact that at present India has to import annually enormous quantities of fresh, preserved, and canned, fruits and vegetables, and other fruit products and by-products, the total value of which runs into crores of rupees. Having therefore, the unique advantage of a large internal market and an abundant supply of all sorts of fruits and vegetables near at hand, there is no reason why such an enterprise should not flourish here.

THE COMPANY HOPES THAT THE FRUIT GROWERS WILL COR-
DIALY WELCOME THIS ENTER-
PRISE WHICH WILL BENEFIT THEM
GREATLY.

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WHAT THE SCIENTISTS SAY

—Being—

EXTRACTS FROM SCIENTIFIC PAPERS AND JOURNALS

1. **Studies in Biennial bearing.** An interesting piece of work with some apple varieties done at the East Malling Research Station, England throws some light on the understanding of factors responsible for biennial bearing habit of fruit trees (i.e. bearing in alternate years). For instance, stripping the blossom from whole trees of Early Victoria apple variety completely changed the year of cropping and increased biennial intensity (violence of yearly fluctuations in cropping); thinning had no effect; stripping the blossom of certain branches or parts of trees gave results differing with the variety—usually the year of cropping of the stripped parts was changed.—Horticultural Abstracts, June 1936.

2. **Vitamin Values of Some Varieties of Apples.** In apple growing regions, the apple could be depended upon as the principal source of the antiscorbutic vitamin C. Investigations on the vitamin C content of apples have shown it to vary with the variety. Of the varieties tested Winesap and Golden Delicious proved to be the richest, whereas Jonathan, Delicious and Richard contained only about half the vitamin content of the Winesap. On storing Delicious and Richard apples at 45°F for 3 months it was found that the fruit lost 1|6 of the vitamin value, for 6 months 1|4, and for one year about 1|2. No vitamin C was lost when apples were stored for 6 months at 32°F. Comparatively small sized fruits were higher in vitamin C value than large sized fruits, which may be explained due to the higher proportion of skin to flesh in small sized fruit. The skin is considerably richer in vitamin C than the same weight of flesh, and studies with Golden Delicious appear to indicate that at least twice as many peeled apples as unpeeled ones are needed to supply the same amount of vitamin C.—Horticultural Abstracts, June 1936.

3. **Cherries: Proportion of Fruit to Leaf-area.** In the experiments reported, which were conducted at irrigation branch station at Prosser, it was found that the cherries of greatest weight and largest size occurred when there were at least one or two leaves per fruit. It was found that cherries may be expected to attain good size, colour and sugar content when the trees do not have an excess number of fruits in proportion to the leaf-area.—Horticultural Abstracts, June 1936.

4. **Nitrogen Benefits Many Trees.** Apple trees especially those 20 or more years' old, usually respond more advantageously to liberal applications of nitrogen.

The fertilizers should be applied two to four weeks before blooming at a rate of about 5 lbs. of Nitrate of Soda per tree for trees 20 years' old that are of average size and vigour for that age.

Bearing Peach trees of average size should receive an annual application of fertilizer equal to approximately three pounds of Nitrate of Soda.

Cherry trees show best results when fertilized at about the same rate and time as apples.—Better Fruit, November 1935.

5. **Effects of Weather Variations in Influencing Yield of Naval Orange.** The note below is an answer to two questions namely (i) what is it that causes a bumper crop of oranges in one year and a comparatively shorter crop in another and secondly: Is there a definite set of factors which influence crop variations; if so, can these factors be determined and measured: and if these can possibly be made the basis of predicting the size of a crop sometimes in advance?

(a) The first of these factors was the maximum temperature during the 4th and 5th fortnight period after full blossom. The higher the temperature, the lower the yield and it embraces what is generally referred to as the "June drop" period. This vital period may occur as



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much as a month and a half earlier in some seasons than others since the peak of full blossom has varied all the way from the 23rd March to the 12th May. From this it follows logically that there is more likelihood of a large crop in season, when the peak of full blossom is earlier because the fruit develops in size by the time the 'June drop' period comes and is better prepared to withstand the heat.

(b) The factor that is found to be second in importance was the mean temperature during a 45 days' period preceding the full blossom period. It was found that higher temperature during this period is conducive to setting of a heavy crop and vice versa.

(a) The factor which ranked third in importance was the amount of rainfall during 2nd and 3rd fortnight period preceding full blossom. The rainfall during this period was found to hinder the setting of a good crop, in other words there was a negative co-relation of rainfall during this period with the yield.

(d) The fourth factor is the number of cloudy days from 15th of December to 15th of February. The greater the number of cloudy days during this interval, the larger the crop, during the spring immediately following, tends to be.

Robert F. Jennings, Technician, East Highlands Orange Co., in the
Caliph Citograph, December 1934.

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 Topaz are my shining quinces,
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 Riches fit for royal pleasures,
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 Fill my pantry chest of treasures,
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A PLEA FOR STARTING BUD SELECTION WORK

—By—

S.S. S. Lal Singh, B.Sc. (Hons.), M.Sc. (Calif.),
Fruit Specialist Punjab, Lyallpur.

It is well-known that the performance of a fruit tree can be greatly improved by proper cultivation, manuring, irrigation, spraying, etc., but this improvement cannot be effected beyond a certain limit which is based on inheritance characteristics of the parent tree. It would thus follow that under the same set of conditions, progeny trees from high yielding parents would give much better performance than progeny trees from low yielding parents. Thus regardless of the cultural treatment given, trees of unproductive strain cannot be made to bear heavily.

2. In any orchard planted to a single commercial variety of repute, there are invariably found a certain number of "off type" trees. These "off type" are generally retrogressive in character. This being the case, wholesale propagation should be discouraged, while greatest care

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should be taken in the selection of budwood from selected trees. To sum up, therefore, the rule for propagation should not be variety, but individuals within the variety. Such individuals can be selected by keeping individual tree performance records year after year.

As a result of the recognition of this fundamental factor, the growers in other advanced countries of the world, are not content with merely planting trees of known commercial standard varieties, but they go a step further and keep performance records of each tree in their gardens, so as to select the heaviest yielding quality fruit trees, which could be used as parent trees for propagation of nursery plants in future. In such countries "Bud Selection Societies" have also been started which, after regular survey of all orchards, select trees of various kinds that are of outstanding merit and arrange to procure buds from them by paying compensation to the owners for the removal of budwood. This budwood is either sold to a number of selected nurserymen, who produce plants from this material under the directions of and on the conditions laid down by the Bud Selection Society, or the Society starts its own nursery where plants from selected pedigree trees are produced and supplied to its members or to the general public. Such societies ordinarily do not make any profit, but exist mainly for the development of fruit industry. It is evident that such nursery plants must be far superior to those supplied by average nurserymen. And for this very reason, the growers are only too pleased to pay higher prices for them. The standard of gardening is tremendously raised by this method while at the same time Bud Selection Societies do not incur any loss.

The Co-operative Bud Selection Society of New South Wales was registered in 1928. It started work in 1929, and supplied 26,000 buds in the first season. In second season 36,000 buds were supplied, and this number was increased to 50,000 in the third season. Thus a total of over 112,000 buds of citrus were supplied by the Society during the first three years of its existence. California Fruit Growers Company supplied over forty lakhs of buds of citrus trees from 1917—1924.

If this movement has given such wonderful results in other countries, it must give equally good if not better results in India where 90 or even 99 per cent of the trees in many gardens are either poor yielders or bear fruit of very low quality, and the general standard of fruit gardening as well as the quality of fruit is much lower than in most other countries. At the same time there are numerous instances of fruit trees existing in the Punjab that are giving wonderful yields of high quality fruit. Several Malta trees in the canal colonies are producing 800—1,000 or even 1,200 fruits each and

some sangtara trees bear as much as 3500 to 4000 fruits each; several mango trees in Muzaffargarh District yield an income of Rs. 200 to Rs. 500 each per year, and some plum trees yield excellent fruit worth Rs. 20 each. Similarly some apple and pear trees exist in the province that are known to bear fruit of as high a quality as found anywhere else in the world, and carry a load of 10 to 15 maunds of fruits each. Some Ber trees yield as much as 20 maunds of fruit each of excellent quality. If a dozen trees in any particular locality can bear such extraordinary yields of fruits of such high quality, there is reason to hope that tens of thousands of other trees (if produced from desirable parent trees and given proper attention) should yield at least one half or one third of the produce given above.

It is certain that at such little expense and in such a short time, no single method of improvement can bring about such revolutionary changes in the general uplift of the fruit industry of the province, as starting of Bud Selection work. The sooner it is taken in hand, the better. The best results can be achieved by the co-operation of the Punjab Fruit Development Board and the Punjab Government in this respect.

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No. 3

LYALLPUR, SEPTEMBER 1937.

Vol. 1

WATER FOR GARDENS

For the rapid progress of the Provincial Fruit Industry it is undoubtedly necessary that the Punjab Fruit Development Board should have liberal resources of men and money to accomplish the desired objectives. Individual isolated efforts on the part of associations or influential individuals are quite right to accomplish minor things of local interest. But there are some weighty problems which affect the whole province and which require general solution. The question of the desirability of having an enhanced irrigational water supply for orchards in the Punjab Canal Colonies is an instance in point.

Past experience has amply shown that individual representations made by leading fruit growers or by local or mofussil fruit growers associations have proved of no avail. While on the other hand it was becoming evident that it would not be possible any further to extend commercial fruit gardening in the Canal Colonies, unless some immediate satisfactory arrangements were arrived at for providing extra supplies of water from the canal authorities. The extension programmes of almost all orchards were thus at a standstill!

Under such heavy odds the Fruit Development Board undertook to fight the cause of hundreds of silent fruit growers.

Although the question of the desirability of enhanced water supply for orchards has been agitating the minds of fruit growers for a considerable time, its importance was brought out in full prominence at the general meeting of the Board held at the Government House, Lahore, on the 23rd April 1937, when a special Canal Sub-Committee was constituted to pursue the matter further. At that time the authorities of the Board were given to understand that the Local Government intended taking up the examination of the question in the very near future. An official meeting consisting of the Secretaries of the Irrigation Department, the Financial

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Commissioner, Development, and the Director of Agriculture, Punjab, was held at Simla in September 1936, and its findings were made available to the Fruit Specialist, Punjab, only at the end of February 1937 and these were brought to the notice of the Managing Committee in its meeting of March 1937. The Managing Committee of the Board considered the findings of the official meeting of September 1936 quite unsatisfactory and decided to pursue the matter further, and the first preliminary meeting of the Canal Sub-Committee was held on 26th May, 1937, with a view to ensure personal exchange of views with the Irrigation authorities. The Honorary Secretary of the Board attended an official meeting convened by the Director of Agriculture, Punjab, Simla, in June 1937, to convey the feelings of the Fruit Growers in regard to water supply to the Chief Engineer, Irrigation Department, Punjab, the Financial Commissioner, Development, Punjab, and others, and to impress upon the authorities the necessity of supplying water for gardens. While the proceedings of this meeting are not yet made public, it is, however, evident that the efforts of our energetic Honorary Secretary, S. S. Lal Singh, have not gone in vain. Water has already been sanctioned for almost all those, who applied before 15th September 1936, and the cases of those who applied after that date will be dealt with after receiving reports from the Superintending Engineers of their respective circles.

The actual correspondence that took place between the Hony. Secretary and the Under-Secretary, Punjab Irrigation Department, is reproduced as under:—

Office of the Honorary Secretary,
Punjab Provincial Co-operative Fruit
Development Board, Limited, and Fruit Specialist,
Punjab, Camp Simla, E.
Dated 16th June, 1937.

D.O. No. 78/S

My dear Sheikh Sahib,

A large number of fruit growers, who are also members of the Punjab Provincial Co-operative Fruit Development Board, have been making representations to us that they had applied to the Canal Department for extra supply of water for gardens and their cases have been pending for a considerable period,

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but they have not received any reply so far. Their representations have been discussed in the meetings of the Fruit Development Board from time to time and we have been requesting the Canal Department also to expedite the matter and also lay down definite rules on which extra supply of water is going to be granted for gardens in future. I shall feel grateful if you would kindly let me know where the matter stands.

Yours Sincerely,
(Sd.) LAL SINGH.

Sh. Mohd. Abdul Hamid, B.A.,
Under-Secretary, Irrigation Department,
Ellerslie, SIMLA, E.
REPLY TO THE ABOVE.

D.O. No. 34.S|Rev.

Punjab Irrigation Secretariat,
Simla, the 16th June 1937.

Dear Sardar Sahib,

Reference your D.O. No. 78|S of date.

The applications for extra water supply to gardens on the Lower Bari Doab Canal, Lower Chenab Canal and Lower Jhelum Canal have been considered and extra supply has been sanctioned for most of those received before **15th September 1936**. Orders will issue to Superintending Engineers shortly. Those applications received after 15th September, 1936 are under consideration and orders will be passed on them after receiving reports thereon from Superintending Engineers. This may take a few months.

(Sd.) ABDUL HAMID,
Yours Sincerely,

TO

S. Lal Singh Sahib,
Secretary, Fruit Development Board, Ltd.,
and Fruit Specialist, Punjab;
Camp Simla.

In the light of the above, we advise our members who are anxious to obtain the necessary water supply for their orchards to move the Superintending Engineers of their respective circles and at the same time to send representations in the matter through the office of the Board.

FRUIT MOVEMENT MAKES HEAD WAY

"Fruit Group" in the Punjab Legislative Assembly

S. S. Ujjal Singh, M.L.A., Parliamentary Secretary (Home) of the Punjab Legislative Assembly and leader of the "Fruit Group", moved a cut motion on the 12th July, 1937, urging the Government to encourage the fruit industry in the Punjab. The debate on the cut motion created a great interest. Nawab Muzaffar Khan, Mian Abdul Aziz, Prof. Roberts, Mr. Amjad Ali Shah, Dr. Sir Gokal Chand Narang and others participated in the debate. They unanimously emphasised the fact that it is high time now to develop the fruit industry of the province to its full extent. Many other phases of the fruit industry, right from the inadequacy of water supply and Kharaba concession to a controversial topic regarding removal of the existing barriers of the Punjab Land Alienation Act, as far as it affects the fruit industry, were mentioned. The Opposition benches, no less than the Ministerial benches, showed sympathy for the development of this industry.

The Punjab Fruit Development Board's Deputation.—Taking advantage of discussions in the Punjab Assembly, the Fruit Development Board quickly organised a deputation, consisting of prominent members of the "Fruit Group" of the Punjab Assembly and other notable fruit growers, like Hon'ble Sir Shahab-ud-Din, K.B. Nawab Ahmad Yar Khan Daulatana, S. S. Ujjal Singh, S. B. Hari Singh, Syed Amjad Ali Shah along with the Honorary Secretary and Assistant Secretary of the Board. The deputation waited on the Hon'ble Major Sardar Sir Sikandar Hyat Khan, the Premier, the Hon'ble Ch. Sir Chhotu Ram, Minister for Development, and the Hon'ble Sir Sunder Singh Majithia, Minister for Revenue.

The deputation represented that in view of the weak financial position of the Fruit Development Board at present, the Local Government may be pleased to (a) lease out free or at a nominal rent the 'Old Fruit Market Site' outside Shahalmi Gate, Lahore, to the Fruit Development Board for organising a Central Fruit Market and (b) that the Punjab Fruit Development Board, being the representative provincial body of the fruit-growers of the Punjab, be raised to a statutory

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body on the lines of the Indian Tea Cess Committee, so that it may help to develop the fruit industry of the province on right lines, (c) to ensure the successful working of the Board and in meeting its recurring commitments, the Board may be granted an annual subsidy of Rs. 5,000 to Rs. 10,000 until the Board's finances are placed on sound footing, a similar subsidy being enjoyed by the U.P. Fruit Development Board since its inception, (d) with a view to provide a permanent source of income for the Board to support its multifarious beneficent programme, suitable legislation be enacted on either of the two lines suggested below, and the income thus accruing be allotted to the Board:—(i) Levying of a cess of -4/- per acre of fruits growing in the Province, (ii) Levying of additional Octroi duty or Terminal Tax on fruits consumed in the Punjab, (e) make arrangements for adequate supply of water for gardens, which the Hon'ble Minister for Revenue promised to consider sympathetically.

The Hon'ble Premier gave a very patient hearing to the deputation, and promised to take the necessary action in the matter at an early date. Similarly the Hon'ble Minister for Development kindly promised to take early steps in regard to the subsidy and other matters pertaining to his charge.

The Board is indeed very grateful to the members of the Fruit Group of the Punjab Legislative Assembly and if all goes well we may expect important developments in the near future.

Congratulations:—S. S. Ujjal Singh, our talented Secretary of the "Fruit Group" of the Punjab Legislative Assembly, and Nawab Fayaz Ali Khan of Kunjpura, Karnal, well known in his district fruit circle, and a member of the Managing Body of our Board, Nawab Ahmad Yar Khan Daultana, Mr. Amjad Ali Shah, and S. Jagjit Singh Man, prominent members of the "Fruit Group" in the Assembly, have been gazetted to important positions as Private Secretaries and Parliamentary Secretaries in the Assembly.

We confidently hope that the fruit industry of the Province will now be pushed forward with beneficent results.

Lahore Fruit Market.—A deputation of the Fruit Development Board, which had previously waited upon the Deputy Commissioner of Lahore, also waited upon Mr. Allan Mitchell, Commissioner of

Lahore Division, with a view to negotiate for the acquisition of the 'old fruit market site' for organizing a central fruit market. The Commissioner gave a sympathetic hearing. Subsequently the Hon'ble Premier of the Punjab Government, during the course of a discussion with the deputation of the Fruit Development Board at Simla kindly promised to issue orders for the lease of the site in question at a very nominal rent to the Board. Matters are now therefore moving in a favourable way.

Hoshiarpur District Fruit Growers.—Thanks to the efforts of Mr. M. R. Sachdev, Deputy Commissioner, Hoshiarpur, the Hoshiarpur District Fruit Growers Association was organised on 1st June 1937 with a membership of over 50. The first office-bearers are:—

President.....Deputy Commissioner, Hoshiarpur.

Vice-President... Khan Bahadur Rashid Mohammad Khan, Senior
Vice-Chairman, District Board, Hoshiarpur.

Secretary.....Agricultural Assistant. Hoshiarpur.

A District Nursery has already been started under auspices of the District Board, Hoshiarpur, for the supply of reliable plants. It is also proposed to encourage the manufacture of fruit products. It is hoped that if this progressive movement continues, Hoshiarpur district will soon acquire an exalted position in this aspect. We learn with pleasure that the Hoshiarpur Fruit Growers Association successfully organised a grand Mango Show on 22nd July 1937 when a large number of prizes were also awarded.

Mango Show at Karnal.—The Karnal District Fruit Growers Association for the second time organised a very successful Mango Show in the District Board Hall, Karnal. The show lasted from 10th to 12th July 1937. No less than 220 exhibits entered competition, representing about 87 varieties of mangoes. Prizes to the value of about Rs. 230 were awarded by K. S. Abdul Majid, Deputy Commissioner, who took a very keen interest in this affair. K.B. Maulvi Abdul Ghani, the Hony. Secretary of the Association, is also to be congratulated on the success of this show.

The Punjab Agricultural Department also organized in July two important fruit shows, viz. Multan Divisional Mango and Date Show at Muzaffargarh, and Divisional Mango Show at Jullundur. At Muzaffargarh several dozen judges had to be appointed to carry out preliminary judging. Mr. F. L. Brayne, Commissioner, Multan, and Syed Bunyad Hussain, Deputy Commissioner, Muzaffargarh, kindly took special interest in this show.

Lyallpur Fruit Growers Association.—The Lyallpur Fruit Growers Association is busy extending its nursery work. A Sub-Committee was appointed to visit important orchards in the district and select trees of outstanding merit, which may be used for propagation of nursery plants for supply to members. The Committee also went to Muzaffargarh and spent several days in selecting prize-winning trees there. Seeds of these fruits have been planted at Lyallpur. Mr. Staintan, the Deputy Commissioner and the President of the Association is taking particular interest in this work.

Grant-in-aid to the Punjab P. C. Fruit Development Board.—The Punjab Government vide letter No. 2669-D of 18th August 1937 of the Joint Secretary, Punjab Development, has been pleased to convey the administrative approval of the Governor Punjab to the Grant-in-aid of Rs. 2,500/- (rupees two thousand and five hundred), for a period of one year in the first instance. The expenditure involved has been permitted to be included in the schedules of new expenditure of the Punjab Agricultural Department for the year 1938-39.

(K. L. KOHLI, M.A., L.S.G.D.)

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Towards the end of rains

YOUNG FRUIT TREES

not in bearing should
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Young Fruit Tree Fertiliser

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Old Fruit Tree Fertiliser

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7.2 per cent Phosphoric Acid
10.0 per cent POTASH

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CHRONICLE OF THE FRUIT WORLD

1. The All-India Exhibition of Arts and Industries at Lahore.—The Punjab Government have decided to hold "The All-India Exhibition of Arts and Industries, Punjab," from 6th December 1937 to the 22nd January 1938 in the Minto Park, Lahore, in the interest of the economic and industrial development of the province. It will be a large-scale exhibition and attract exhibits from all over India.

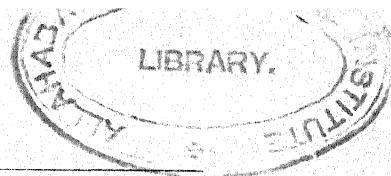
The Fruit Section of the Punjab Agricultural Department has started preparations on a vast scale for a Horticultural Show to be put up in the exhibition.

2. Patiala State Eager to Develop Its Horticulture.—As a result of the visit of Prof. R. W. Hodgson of the Citrus Division at the University of California to Patiala State last winter, the State authorities have planned to develop horticulture on a large scale in the State territory, and engaged Mr. Knowlton of California, who has brought a large shipment of deciduous nursery plants from California. He will supervise the planting of the trees.

3. India's Minor Industries and Japanese Competition.—The Government of India have entrusted the investigation of claims of the Indian Minor Industries for protection against Japanese competition to Mr. R. K. Nehru, I.C.S.

Kulu fruit growers may do well to prepare a case for the apple industry, which is at present faced with a hard competition by Japanese imports. The Punjab Fruit Board is ready to assist the representation.

4. A Victim of "New Health Certificate Regulations".—Mr. A. H. Lee of the Bundrole Orchards, Kulu, imported a big consignment of plants from the Yokohama nursery, Japan. The delivery of plants was, however, withheld by the Customs Department, Calcutta, as they challenged the validity of the certificate of the Plant Inspector, Japan, who had signed the health certificate. By the time the Consul-General for Japan, Calcutta, had endorsed the bona fides of the Plant Inspector of his country, almost all the plants were withered.



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We therefore extend our sympathies to Mr. A. H. Lee for the heavy loss he has sustained through no fault of his. It will be only fair that the party responsible should make good this loss.

5. The Mandi Fruit Growers.—The newly appointed State Horticulturist is organizing a Fruit Growers Association in Sarkaghat Tehsil, Mandi State. This has met with good response from the growers.

6. Meetings.—A meeting of the Sub-Committee of the Imperial Council of Agricultural Research on Horticulture will be held at Simla on 13th September 1937. All the heads of the Horticultural Sections of various provinces are expected to participate.

7. Simla Fruit Show.—There will be a large scale Fruit Show in hilly Fruits at Simla from 20th September to 23rd September 1937. For particulars kindly apply to the Deputy Director of Agriculture, Jullundur, or Director of Agriculture, Punjab, Lahore, or the Fruit Specialist, Punjab, Lyallpur.

8. Crops and Soil Wing of the Board of Agriculture in India.—The Second meeting of the Crops and Soil Wing of the Board of Agriculture and Animal Husbandry in India will be held at Lahore from 6th to 11th December (both days inclusive). The 8th and the 9th December will be devoted to inspecting the Agricultural College and Research Institute, Lyallpur. The Fruit Specialist, Punjab, has put up a number of useful proposals which, if approved, would certainly further the cause of the fruit industry.

9. Imperial Council of Agricultural Research, India, and the Fruit Industry.—An increasing amount of attention is being given year after year to fruit research. The well-known phenomenon of an alternate bearing in mango is being specially examined at the Sabour Fruit Experiment Station in Bihar. At Chaubattia in U.P. the work deals mainly with hill fruits covering such problems as propagation, pruning and insect-pests. In C. P. a scheme of work dealing especially with the well-known "Santra" orange has been started. At Montgomery in the Punjab experiments have been started on Citrus and rootstock problems and Grape-hybridization, while at Lyallpur extensive experiments are being conducted in fruit preservation and juices. Cold storage of fruit has continued to be dealt with at the Ganeshkhind Fruit Experimental Station at Kirkee, Poona, and an important advance has been made in extending this work to the gas storage of fruits and

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vegetables. As the Imperial Council of Agricultural Research is interested in improving fruit storage facilities, it has decided to conduct further research into the best methods of refrigeration both in store and transit.

10. Arrangements for Conducting Experiments on Cold Storage of Fruits.—The Department of Agriculture, Punjab, and the Imperial Council of Agricultural Research have accepted the offer of the Cold Storage Co. of Northern India, Ltd., for free supply of an experimental plant for conducting experiments on Cold Storage of Fruits and other perishables. Dr. Harbant Singh, Ph.D. (Edin.) has been appointed under the Fruit Specialist, Punjab, to carry out this work at Lyallpur.

11. The Imperial Fruit Show.—A new and attractive feature of the Imperial Fruit Show and Canners Exhibition, to be housed in the Bingley Hall, Birmingham, from Wednesday October 20th to Thursday October 28th, will be a Cinema, showing twice or thrice daily a programme of 'Sound' and 'Silent' films dealing with fruit production and marketing, in Great Britain and in the Empire. The Ministry of Agriculture has been approached for loan of films dealing with Apple Production, Canning and Honey; Australia and South Africa are lending two films each, and one more is expected from Canada. A highly interesting programme will thus be provided for.

The Department of Agriculture, Punjab, may also consider the advisability of introducing in the next provincial Fruit Show at Lahore these films that may be imported from abroad.

12. British Agriculturist Visits Russia.—It is reported that Sir E. John Russell of the Rothamsted Institute, Harpenden, is to lead a group of members and friends of the Le Play Society to Russia with a view to study the ways and means, which the Soviet Russia is employing in developing the Agricultural industry on a large scale.

13. Pest Control in U.S.A.—A proposal is afoot to place a sum of \$13,713,118 to the credit of the U.S.A. Department of Agriculture for the use of the Bureau of Entomology and Plant Generation in order to be used in campaigns against insect pests and plant diseases.

14. Washington "Apple Advertising Bill" Passed.—The Washington "Apple Advertising Bill" has passed both the Senate and the Congress. The measure provides for a Commission of seven to supervise a tax of two cents per hundredweight on apples, payable when shipped. The proceeds of the tax will be used to finance the apple advertising campaign. Similar

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legislation is in vogue in Palestine for advertising the Jaffa oranges. We commend to the Punjab Government this procedure for the development of the fruit industry.

15. Orchards in Washington State.—The problem of cleaning up pest-infected orchards in Washington State will be somewhat easier henceforth. Owners of these orchards will now have only ten days' notice to clean up the orchards themselves or the Horticultural Inspection Department will proceed with this work in event of the owner failing to do so.

16. Fruit Plant Patent.—New varieties of plants which may be asexually reproduced are patentable at the patent office of the U.S.A. from May 1937 onward.

17. Vitamin C Tablets.—We learn that Vitamin C in tablet form has been produced.

18. X-Ray and the Orange.—Employment of the X-ray to preserve high quality standards for citrus fruits and thus maintain their reputation is a point scored by the California Fruit Growers Exchange. The X-ray method would help to eliminate frost-damaged fruits from sound ones.

19. Australian Apples.—The Federal Ministry of the Commonwealth of Australia decided to pay a bounty of 4½ d a bushel case to growers in respect of apples and pears exported from Australia in the year ending December 1936.

20. British Fruit Directory.—The British Continental Press Ltd., 80 Fleet Street, London, E. C. 4., announced that a Fruit Annual and Directory containing all possible information about the Fruit Trade in Great Britain, is in press.

21. Fruit Industry in Foreign Countries.—The Punjab Fruit Development Board has made arrangements for publishing four Reports of the Fruit Specialist, Punjab, dealing with the fruit industry in Egypt, Palestine, Italy and Sicily, France and Switzerland. Please write to the Hony. Secretary for rates of advertisement in these bulletins.

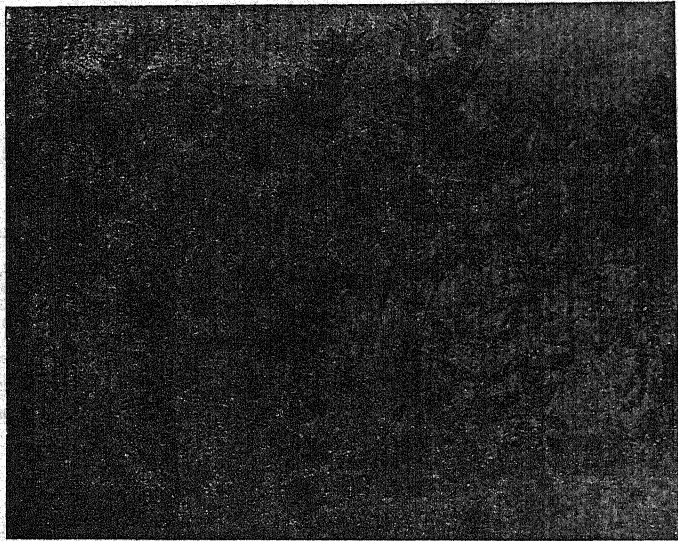
22. Codling Moth.—Mr. E. J. N. Newcomer, Senior Entomologist, Federal Entomological Laboratory at Yakima has found in **Phenothiazine** a potential substitute for lead arsenate for the control of Codling Moth. It has done remarkably well in withholding entrance of the worms.

23. Apple Sprays.—The Spray Specialist of the State Experiment Station, Geneva, New York, has developed a chemical spray known as Dinitro-ortho-cyclo-hexyl-phenol, commonly called "D.W." oil, which with one single application can control pests like bud moth, and scales like San Jose scale, and Scruby scale.

(By K. L. Kohli, M.A., L.S.C.D.).



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DEPUTY COMMISSIONER.
Ludhiana Distt. Ludhiana.

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Camp Bishanpura.
January 12, 1937.

G. E. C. WAKEFIELD, Esq.,
Ex-Prime Minister, Kashmir.
Managing Partner,
Northern India Farms Ltd.,
Rawalpindi, Punjab, India.

IS THERE REAL DANGER OF OVER-PRODUCTION OF FRUIT IN PUNJAB ?

—By—

S. S. LAL SINGH, B.Sc. (Hons.), M.Sc. (Calif.), Fruit Specialist, Punjab.

One of the commonest observations frequently made by people is that, if planting of gardens goes on at the present rate, fruit growing would soon become unprofitable as the fruit would sell very cheap like other grain crops.

This apprehension of the people seems to be based on the wrong impression that the work of the Agricultural Department is only to encourage the extension of fruit gardens; whereas the constant endeavour of this Department is to look into very important phase of the fruit industry and to avoid one-sided progress. The total area under fruit gardens in the Punjab is only about 62,000 acres (1933), which shows that for every 1,000 acres of cultivated area there are only about two acres under fruit trees or one acre for every 500 men in the Punjab,—the total cultivated area in the Punjab being three crore acres. Compare these figures with those of California, which, with a population of about 50 lakhs has about 20 lakh acres under fruits, Palestine, with a population of about ten lakhs, has about two lakh acres under fruit gardens. France has about 25 lakh acres (1928) under grapes alone.

Advanced fruit growing countries like California, Palestine, Italy, South Africa, etc., export large quantities of their fruits to foreign countries. Palestine, with a population equal to only one district of the Punjab, exports about 3½ crore rupees worth of Citrus fruits alone; Italy's export in garden produce (1932) amounts to one-third of her total exports. With our excellent canal system, varied climatic and soil conditions and cheap labour, we should be able to build a decent export trade in the Punjab.

Fruits are no longer the luxury and monopoly of the rich only, and the time is fast approaching when they will find a place in the daily diet of the poor. Fruit growers complain that Malta oranges formerly used to sell at 4 to 6 pice each, but they are now generally sold at one or two pice each. They need not feel nervous over this continuous fall in market prices, for every possible measure is being taken to ensure a reasonable margin of profit for them. This is being

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done on the one hand by increasing the average yield of fruit per tree as well as by increasing the quality of fruit, and on the other by reducing the cost of production, so that the grower by selling the fruit at a lower price may still make a reasonable profit. Other methods adopted consist in reducing the middleman's profit, bringing about a uniform distribution of fruits in various markets, and making the fruit available over a longer period by cold storage, utilizing the surplus fruits, which at present go to waste, for bye-products such as jams, jellies, marmalade, Chutnies, etc., and finding new outlets for our fresh fruit of good quality.

In all future extensions or plantings of fruit gardens, it is our policy to advise people to plant only the heavy-yielding strains. In the case of old gardens the average yield for Malta orange trees may not amount to even 50 fruits to a tree, but we are now expecting from newly planted Malta trees a yield of 200 to 300 Malts on an average per tree and many Malta trees are now seen bearing 500 or even 1,000 fruits each and some Sangtra trees bearing 2,500 to 3,500 fruits each. With the launching of the Bud Selection programme we confidently hope to improve crops considerably both in quality and quantity, resulting in increasing the returns of fruit growers. Date fruit of most indigenous varieties is sold at one or two rupees per maund whereas the fruit of Basra date varieties introduced by the Agricultural Department sells at Rs. 5 to Rs. 15 per maund. Mango fruit of most seedling trees sells at one rupee a maund and sometimes even less, but Langra mango easily sells at Rs. 7 per maund. Formerly not more than a few trees of blood-red Malta orange were to be found in any locality, but now large numbers are being planted in solid blocks. Plantation of new and better varieties is the order of the day.

Apart from increasing the yield of fruit per tree, we are also aiming at cutting down the cost of production. The cost of plants used to be the main item of expense in the establishment of an orchard on account of the high price of plants. The usual price for Malta trees used to be about Rs. 1|8|- each or about Rs. 50 to Rs. 200 per acre and some blood-red Malta plants were purchased at even Rs. 3 each. The Department of Agriculture now supplies Malta plants of blood red varieties at about -|6|- each and other varieties at -|5|- each, and the plants of deciduous trees at even a lower price than this. The

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Department has established about a dozen nurseries scattered all over the Province, and in a year or so it will be able to supply 50,000 to 100,000 plants a year. With this reduction in the price of plants alone, the cost of plantation has been cut down to about $1\frac{1}{4}$ th of the original. Similar reductions have also been made possible in the cost of manuring, irrigation, cultivation and other maintenance charges by advocating plantation of uniform varieties of particular fruits in a particular area, instead of jumbling together a number of different fruit trees and varieties as used to be the case formerly, replacing hand cultivation with bullock cultivation, better methods of irrigation and manuring. An additional supplementary source of income has been found possible by inter-cropping or growing of leguminous farm crops and vegetables between the fruit trees, as in new gardens fruit trees are planted at fairly large distances apart.

To find an outlet for the increasing quantity of fruits not only new markets outside the Punjab are being sought, but new avenues inside the province are also being created. A few years ago hardly a bottle of lemon or orange squash was prepared in the province, and fruit juices and squashes were imported in large quantities from outside, but at present it is estimated that 2 to 3 lakh of bottles are annually produced in the Punjab. The Indian Mildura Fruit Farm, Renala Khurd, alone contemplates producing this year about $1\frac{1}{4}$ lakh bottles and in the next few years the Punjab should be able to produce about 15 to 20 lakhs of bottles of Citrus squashes alone. There should be in all towns of the Province thousands of "fresh fruit juice stands" like those now seen in some places in Lahore, where real fruit drinks could be available at a cost of six pice or so per glass. There is also no reason why about four crore bottles of aerated drinks (the present approximate consumption of the Punjab), which are all synthetic preparations containing artificial flavour, colour and saccharine, should not be prepared from real fruit juices. The development of the juice industry alone in the Punjab would mean more area under gardens, more income to Zamindars and increased revenue to Government. We must also develop the fruit by-products industry, so that the surplus fruits unfit for sale may be converted into jam, jelly, marmalade, juices, pickles, citric acid, etc.

At present the general practice amongst the growers is to sell their fruit on the trees to contractors—a necessary evil at present but which is not in the interest of the growers. The fruit is again not evenly distributed

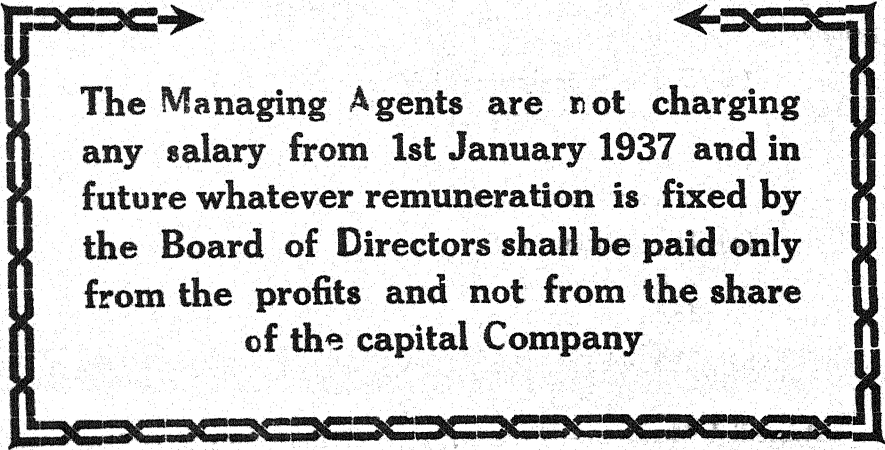
in all markets—at some places fruits are expensive, at others very cheap, and all this ultimately means loss to growers. In the absence of facilities for storing fruits in cool places for long periods, all the fruit, when ripe, is dumped in the market and is sold at ridiculously low prices. But in a year or so we expect to have a chain of cold storage plants, where fruits can be stored for months without spoilage so that Malta oranges, mangoes and other fruits will be available over a much longer period than at present, and this would be in the interest of both consumers and producers. Apart from this we should recommend such varieties as ripen at different seasons,—some very early and other very late,—and this would avoid a glut in the market at one season.

Finally the growers are realizing the blessings of co-operation. District Fruit Growers Associations are being organised and the Provincial Fruit Development Board is already formed with an ambitious programme of work. We may look forward to the day when all fruit growers will be organized into one strong body which may not only supply the requirements of the growers at a low cost on a co-operative basis, but eliminate the evils due to contractors and other middlemen, grade the fruit properly in their own packing houses, establish their own fruit markets and regulate the sale of fruits by even distribution in various places both in and outside the province. It may be noted that when fruit growers in California were unorganized, they had a serious problem to face in profitably disposing of the fruit of even a few lakhs of acres, but now with the advent of the California Fruit Growers Exchange—the biggest organisation of its kind in the world—this State of about fifty lakh population having about twenty lakh acres under gardens no longer experiences this difficulty. When they had only 30,000 acres under grapes, they thought they were over-producing and vine-yards were being uprooted; but now the area under grapes alone is about 4 lakh acres while the Grape Growers Association disposes of all the grapes profitably. Peach Growers, Walnut Growers, Citrus Growers, etc., have their separate organisations. Palestine, South Africa and others have followed the example of California. Although the standard of fruit cultivation in Italy is lower than in France, yet because of better organisation of Italians in recent years, they have beaten the French hollow in fruit export.

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The fruit industry in our country must pass through several stages and there should be no room for despair. The greatest need in India is to drive away the defeatist mentality that breeds nothing but constant pessimism which is the curse of this country as most of our intelligentsia take pride in always depicting the dark side of each enterprise.

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THE LAHORE FRUIT MARKET

—By—

K. L. KOHLI, M.A., L.S.G.D., Assistant Secretary,
Punjab Provincial Co-operative Fruit Development Board, Lahore.

Scope.—Fruit growing is one of the most promising industries of the Punjab. In spite of its having received an impetus only recently this industry is developing by leaps and bounds, and in the wake of increased production, the question of organisation looms large. For this reorganisation and development, undoubtedly, Lahore affords many facilities.

Existing Marketing Conditions.—It is, however, unfortunate that unlike other big towns Lahore lacks modern fruit marketing facilities. Again due to absence of well-controlled distribution of fruit supplies in accordance with the day-to-day requirements of Lahore, prices fetched by fruits at Lahore are sometimes very low. Lack of proper cold storage facilities also, to a great extent, accentuate the evil of mal-distribution of supplies.

There is one apologetic private wholesale fruit market on Fleming Road, over which the Lahore Municipality has ~~no~~ appreciable control. The Municipality however runs the Tollinton market for retail fruit and vegetables. This is a small market.

The state of affairs in the existing wholesale private fruit market is appalling.

- (a) The extremely unsatisfactory conditions of sanitation prevailing in the market.
- (b) Being situated in a congested place, the movement of fruit is very much hampered.
- (c) The working of this market is a clique-ridden monopoly of a small number of fruit 'Arhtias,' with no correct or uniform system of counting, measuring and weighing.
- (d) There being no proper storage facilities, the prices fetched from day to day are very low.

Remedial Measures.—Fruit growers of the province lose much under this system of marketing, because it does not fetch them fair return for their produce. The consumers also do not get fruit at cheap rates

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because of middlemen's high commissions. Fruits and vegetables offered for consumption are unhygienically handled. Now when the lease of the existing private market on the Fleming Road is about to expire, it is the right time for setting up a standard modern fruit market in some better locality with pucca flooring, a good supply of water, good drainage, a shed to afford protection during rains, arrangements for produce to be sold under sanitary conditions and above all a fair and square deal of business free from any undesirable clique or group. To this end the following tentative proposals may be examined:—

(a) **A private fruit market controlled by a few men or a Joint Stock Company.**

This enterprise would secure ample support from the fruit growing public but it is doubtful if the Government would lend its direct support to a private concern.

(b) **Municipal Fruit Market.**

This market would be welcomed not only by fruit and vegetable growers but by the consumer also. Honest commission agents and "Artis" would also welcome it. This is therefore the suitable course to adopt.

In view of other pre-occupations it seems that the Lahore Municipality may not undertake this work for years to come. At least the Administrator of Lahore Municipality could not assure the Deputation of the Fruit Development Board that he could take up this work in the near future.

As the necessity for starting the market is being keenly felt, the Fruit Development Board decided to assume the responsibility of organising a standard Fruit Market at Lahore, and the Executive of the Board is negotiating with the Local Government to acquire the old Fruit Market site outside Shahalmi Gate. It is hoped that this site will be leased to the Board at a very nominal rent.

With the market site settled, the following problems arise:—

- (a) How is Municipal co-operation to be sought in making the scheme a success?
- (b) In what way can other interests be represented in the management of the institution?
- (c) What sources should be tapped for funds in order to have an appropriate building?

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- (d) What arrangements should be made to meet the recurring expenses?

These and many other questions will have to be decided by the Board's Marketing Committee.

- (a) **Municipal Co-operation.**—It is rightly felt that as the Fruit Development Board will be rendering a great service to Lahore town by putting up a standard fruit market, it is very necessary that the Municipality should help the Board by giving the Board's Market a statutory recognition by closing the present wholesale Fleming Road market. As the Municipal Act is not, however, clear on the point whether the Lahore Municipality is competent to take the step or not, the Board should be prepared to get the specific legislation passed by our Assembly by making representations.
- (b) **The Management.**—In order to secure the interests of the Fruit grower, the middleman and the consumer, the following Fruit Market Committee is tentatively proposed to trust the management to:—

Ex-Officio Members.

1. The Administrator (or the President of the Municipal Committee.
2. The Fruit Specialist, Punjab.
3. The Marketing Officer, Punjab.
4. The Deputy Registrar, Co-operative Department, Lahore.

Other Members.

- 5 & 6. Two representatives of the Lahore Municipality when it is revived or they may be nominated by the Administrator.
7. & 8. Two nominees of the Managing Committee of the Fruit Development Board, Lahore.
9. One representative of the Commission Agents carrying on work in this market.
10. One representative of the Cold Storage Co., Ltd., if a cold storage plant is installed in the Market.

- (c) **The Building.**—Although the Board's members offer to meet the capital outlay of this building with a guarantee of fair interest, it



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will be much better if the Board succeeds in persuading the Lahore Municipal authorities to finance the construction, which may not cost more than Rs. 30,000. The Fruit Development Board should be willing to pay to the municipality a reasonable rent for the building, or a portion of the profit can be given away to the Municipality. This would ensure closer contact between the Lahore Municipality and the Fruit Development Board. Income would accrue from the space rented separately by commission agents, or a fixed rate per basket of fruit and vegetable sold in the market can be charged. The latter method is commonly adopted in western countries.

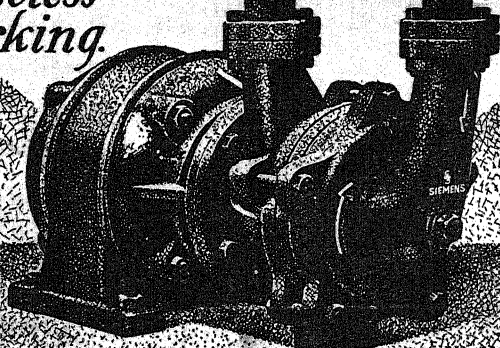
(The proposals are personal views and in no way represent the views of the Fruit Development Board. They are some of the views that have been expressed from time to time in the Fruit Market Sub-Committee of the Fruit Development Board. Other members are welcomed to offer their valuable suggestions on this important matter—Editor).



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SEASONAL HINTS

In the last issue of the Fruit Journal it was stated that during the monsoon season the work mainly consists of propagating many kinds of nursery plants and transplanting of evergreens. Besides these, there are other items of work connected with general orchard management that need proper attention. These, along with nursery operations, are enumerated as under:—

(1) Citrus rootstock seeds practically ripen in August, when they can be grown in small raised beds for producing stock seedlings.

(2) Citrus rootstock cuttings should also be planted in the beginning of September preferably, because planting at this time ensures better rooting than if done in February.

(3) Mango pits can be grown in the beginning of August or even in the middle of July in nursery beds.

(4) Citrus and mango seedlings grown in the nursery become fit for transplanting after about a year's period. The mango seedlings should be potted in the middle of July but citrus stock seedlings should not be transplanted before the middle of September.

(5) Budding of citrus and grafting of mango seedlings can be taken up early in August.

(6) Topworking of 'Ber' can also be done in the monsoon season in addition to that done in April.

(7) It was stressed in the previous issue of the Journal that scion varieties to be used for budding and grafting should be only those that have been obtained from plants of standard commercial varieties of repute.

(8) Detailed instructions regarding propagation of Citrus, which can also be applied, in general, to budding of 'Ber' appeared in the last issue.

(9) Kagzi limes, sweet limes, grape vines, and litchies can be layered during August and September.

(10) Citrus plants like Malta, Sangtra, lemon, limes, and grape fruit, mango grafts and guavas, etc., can be transplanted in the monsoon season, but they will do better if transplanted in spring, when all kinds of

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fruit trees are transplanted. Loquats should, however, be transplanted early in winter, viz., by the middle of December.

(11) Weeds sprung up during rains are ploughed in as frequently as the soil conditions permit. Pernicious weeds like 'Baru' may, however, advantageously be spaded out by hand picking of the rhizomes.

(12) Green manuring crops like 'Guara' and 'San' should be ploughed in at the flowering stage. It has been observed that 'Guara' as a green manuring crop does not give encouraging results in a Citrus orchard, hence 'Senji' may preferably be grown in winter for this purpose.

(13) Citrus canker spreads more readily in the rainy season than at other times of the year. Hand picking of affected leaves and fruits, and pruning of affected twigs and branches would considerably assist in controlling this disease. The collections from infected trees should be carefully burnt, otherwise spores from infected leaves lying on the ground will multiply whenever conditions become favourable, and the disease will spread by leaps and bounds.

SOME SALIENT POINTS ABOUT NITROGEN-CARRYING FERTILIZERS

—By—

DR. SHAM SINGH, B.Sc., Agr. (Punjab), Ph. D. (Bristol),
Assistant Horticulturist, Lyallpur

For maintaining soil fertility, cultivation and addition of well-rotted farmyard manure, has been employed from time immemorial. But large yields and high returns demand additional soil treatment, either by growing some leguminous crops for the purpose of green manuring or in the form of direct fertilizer application.

The question of direct fertilizer application to Fruit trees did not attract the attention of growers till only recently. No doubt, farmyard manure still ranks to be the best source of plant food, but its very limited amount and the difficulty associated with its transportation to each and every place demands the use of nitrogen-carrying fertilizers like ammonium sulphate and sodium nitrate. Punjab soils are generally deficient in nitrogen, which is one of the most essential elements for plant growth, hence the importance of nitrogen-carrying fertilizers cannot be over-emphasised.

There has been a considerable awakening as to the amount and time of application of such fertilizers, but their comparative usefulness and the effect of their continual use on plant growth under different conditions are but little understood. Further, it is a matter of common experience in regard to the use of fertilizers that the growers are invariably inclined to point out the so-called harmful effects arising from their continual use without knowing how easily they could be avoided or overcome. It is the purpose of this short note to educate opinion regarding all such points by gathering together the evidence on the use of these fertilizers as recorded in literature.

1. The elements essential for growth are absorbed by plants in two forms, acidic and basic. The plant food elements like iron, potassium, calcium, magnesium, etc., have basic properties, while phosphates and sulphates have acidic properties. Both forms of elements are, as a rule, present in greater or less amounts in every soil.

2. Nitrogen is the only essential element that does not conform to the general rule narrated above. It can be taken in by plants in both acid and basic forms, viz., either as ammonia (basic) or as nitrate (acid).

3. In strongly acid soils acids are absorbed more readily and in greater amounts, whereas in basic or weakly acid soils bases are, as a rule, taken up.

4. Soils are not homogeneous throughout with respect to these elements. Hence the roots in acid region absorb acids but in basic ones take in bases. This condition ensures root absorption of all the elements, that are essential for plant growth.

5. Although nitrogen forms 78 parts by volume of the atmosphere and plants daily bathe in it, yet this element can only be taken up by the plant through its roots from the soil.

6. Some legumes fix atmospheric nitrogen with the aid of nitrogen-fixing bacteria and the cultivation of these leguminous crops thus helps to increase the nitrogen content of agricultural land. Nitrogen is, however, mainly applied to the soil in an organic form the chief source being the farmyard manure. The inorganic compounds rich in nitrogen are nitrate of soda and sulphate of ammonia, which contain 15 to 16 per cent. and 20 to 21 per cent nitrogen respectively.

7. Nitrate of soda carries acid nitrogen and sulphate of ammonia carries basic nitrogen. Thus in an acid soil the effect of nitrate of soda will be more marked as nitrates will be absorbed more readily than ammonia, and vice versa.

8. The Punjab soils are as a rule basic, thus offering greater scope for the use of sulphate of ammonia than nitrate of soda.

9. If sodium nitrate is applied to a piece of land over a series of years, the nitrate will be taken up by the plants and most of the soda will be left behind, though some of it may be absorbed. It being readily soluble, most of it leaches out under humid conditions, but in arid regions it will accumulate making the soil alkaline. The iron content of the soil is rendered insoluble and the plants become diseased.

10. The continual use of sulphate of ammonia has quite the opposite effect, as the soil becomes acid. Ordinarily acid soils are not so harmful as the alkaline. In fact it is not necessary to correct soil acidity so far as the fruit trees are concerned. Strawberries and brambles do best in acid soils and even oranges grow well under such conditions.

11. Fortunately the harmful effects of the continual use of either of these fertilizers may be counteracted by the application of the other. The application of sodium nitrate would counteract soil acidity, though marked effects may be obtained only after a number of years. Likewise application of ammonium sulphate would tend to correct soil basicity.

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**Copy of the Inspection Report of
J. H. RITCHIE, Esqr.,**

M.A., B.Sc., I.A.S.

*The Director of Agriculture, United Provinces, on the
Henbane Nursery, Saharanpur, dated February
18th and 19th, 1936.*

I had great pleasure in visiting the Henbane Nursery belonging to M. Qurban Ali Khan of Saharanpur.

M. Qurban Ali Khan has turned his gardens into institutions worthy of being copied by all nursery men. He has very large supplies of plants true to type and true to name which can be relied on by the Public. His nursery is the best I have seen in India and the Public can be assured of obtaining what they are paying for when they buy from him.

(Sd.) J. H. RITCHIE,

Director of Agriculture,

United Provinces.

Dated 19-2-1936.

A NEW BIRD-FRIGHTENING DEVICE

—By—

S. BASANT SINGH, Fruit Section, Lyallpur.

Flying foxes are a perpetual source of nuisance and trouble to the growers of cold region fruits, inasmuch as they cause heavy damage to their crops. During my long stay in the Kulu Valley, I noticed considerable damage being caused to ripening apples, pears, persimmons, etc., despite the owners' engaging whole night watchmen with guns. A number of these birds are shot in each garden but all this does not materially reduce their ravages, because the Chaukidars do not perform their duties faithfully, as they go to sleep late in the night. I have seen cases in which half a dozen big apple trees were completely deprived of their fruit in a couple of nights where the owner failed to arrange a night watch. It has also been noticed that these birds, prefer highly-coloured and big-sized fruit that is usually the best fruit. As they keep on flying from tree to tree and strike with force against fruit-laden branches on which they try to alight, more fruit is dropped than is actually devoured by them, and the ground beneath the trees becomes littered with fruit which, though apparently sound, is unfit for export.

Many varieties of apples, pears and persimmons (the last particularly) can, with advantage be left on the trees to be picked later as needed, but it is not possible to do so with these birds frequenting the orchards. The growers are therefore forced to gather their crops before the fruits are properly ripe, although leaving them on the trees for a longer period improves their taste and flavour.

Crows and other small birds also damage cherries, persimmons, etc., throughout the ripening and the gathering periods. Employment of manual labour for frightening these birds is unreliable as well as very expensive. I am, therefore, giving the following information regarding a new Bird-Frightening Device which has proved successful in keeping deer and harmful birds out of the orchards in America, and this device is worth giving a trial in our orchards infested with foxes and other injurious birds:—

The new Bird-Frightening Device is a carbide automatic flash gun, costs about \$35.0 and is manufactured by the Linde Air Products Company, New York. The gun operates by dripping water on carbide,

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thus generating an explosive gas. The gun goes off every few minutes with a loud report accompanied by a flash of light. Carbide must be renewed every day. One gun is said to protect 1,000 trees.

Mr. H. A. Cardinell, Michigan State College, made trials with this device in cherry orchards and he has proved that it drove out 90 per cent of the robins from the orchard for the entire season. It also seemed to completely rout startlings and crows.

The cost of operation was 47 cents an orchard acre. Another orchard owner who tried these flash guns reported that 100 lbs. drum of calcium carbide cost \$6.25 and it would last, using two machines every night, from April to October.

The observations also seem to indicate, says Mr. Cardinell, that such an exploding device, when placed on a pole above the plants, combines two essential bird baffling features,

- (1) a loud report every 2 or 5 minutes.
- (2) sudden motion, as each explosion causes the device to swing around several times.

These two features make the device more effective than a patrolman on the ground shooting an occasional shot when the birds are in range. The cost is also much less.

Incidentally except for the few days when these birds are injurious to crops, they are invaluable as destroyers of harmful insects for the rest of the season. The device has, therefore, the double advantage of protecting the crops as well as preserving the birds which, for reasons explained above, are not to be destroyed.

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PHYSIOLOGY AND NUTRITION OF PRUNING

—By—

MR. H. S. DINSA, M.Sc. (Kansas), Officiating Superintendent,
Government Lawrence Gardens, Lahore.

An understanding of the basic principles of Plant Physiology that affect growth and fruit production is a necessity for a fruit grower before he can intelligently proceed to prune his trees.

Physiological Factors.

It had long been recognised that factors favouring vegetative growth were averse to fruit production, but these factors were least understood. It is observed that plants in warm humid climates grow to great sizes and have abundance of foliage but bear little or no fruit. Severe pruning favours vegetative growth and is usually followed by decreased fruiting. Conversely conditions which act as a check to vegetative growth tend to increase fruit production. Under conditions of reduced water supply, certain type of summer pruning or other similar factors less favourable to vegetative growth, the tendency to reproduce becomes more pronounced and the chief function of life, i.e. to reproduce its kind, becomes more marked.

It would, therefore, appear that the fruiting power of a tree depends on some balance that exists between the factors conducive to vegetative growth and those conducive to fruit production.

Further analysis of these factors is essential to the proper understanding of pruning problems.

Conditions favouring fruit production may be placed in two groups as under:—

1. **Climatic Factors.**—Of these the most important are the intensity of light and its duration, temperature and humidity. All these promote vegetative growth up to a certain point. These factors are ordinarily beyond the control of man but they can be modified to a certain extent by judicious pruning.

2. **Cultural Factors.**—Nutritional factors govern fruit production by food supply. These very important factors are considered as under:—

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- (a) Carbon forms the bulk of plants. It is taken in by green leaves in the form of carbon dioxide which in presence of light is synthesized into carbohydrates (sugars and starches) that provide energy for plants to grow and reproduce.
- (b) Soil. As compared with carbon, a much less amount of other substances is taken from the soil by the roots. Of these the most important is **nitrogen**.

Thus an equilibrium is established between these two substances (i.e., carbohydrates and nitrogen) and this determines fruitfulness or barrenness of fruit trees. This equilibrium or relation between the "carbohydrate manufacture" by the leaves and the "nitrogen" taken up by the roots of the fruit trees may be put into four classes according to Kraus and Kraybill:—

- (i) Fruitfulness results when the nitrogen supply is sufficient but the carbohydrates are in excess of the immediate need of the tree for growth.
- (ii) Vegetative growth accompanied by the production of little or no fruit results, when the nitrogen supply is ample but the carbohydrate reserve of the tree is just sufficient for its immediate needs for growth.

3. **Nitrogen shortage.**—With this condition even a surplus of carbohydrates results in yellowish leaves, slender and short growth, and an abundance of flowers which usually do not set and fall prematurely.

4. **Carbohydrate shortage.**—This condition with an excess supply of nitrogen also results in weak trees with yellowish foliage. No flowers or fruit may be found on such trees.

Relationship of the above Conditions to Pruning.

1. **Pruning of young trees.**—Young trees in the orchard are pruned to build their shape and framework. If they are pruned more severely, the period of their coming into bearing is prolonged. This is explained by the fact that when a young tree is planted in the garden, there is ample supply of nitrogen in the soil but a very little leaf area per unit length to cause an accumulation or excess of carbohydrates. Thus the young tree carries on only the vegetative growth in its early years of life. As the carbohydrate manufacture increases with the increase in

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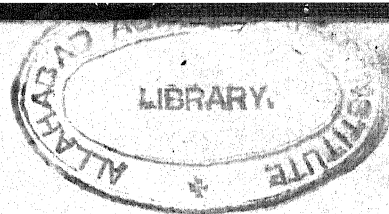
leaf area per unit length, the tree comes into bearing. If at this stage the leaf area (consequently carbohydrates) is reduced by heavy pruning, the tree is thrown into vegetative growth and less or no fruiting results.

It is at once clear, from the above explanation as to why young fruiting trees should be pruned lightly.

2. Pruning of old bearing trees.—When the tree is planted, it remains there for years. It tends to deplete the soil of its nitrogen supply. Because of the comparatively large top, developed with age, there is bound to be an accumulation of carbohydrates. This condition is akin to class 3 mentioned above. It brings about nitrogen shortage which is remedied by reducing the carbohydrates in the foliage by pruning to a level where they are a little in excess of those required for growth that can be supported by the already limited yet sufficient supply of nitrogen. Thus pruning is an essential horticultural operation in old bearing trees to keep up their fruit producing habit.

After understanding the nutritional factors, pruning essentially means to establish the balance between the carbohydrates and nitrogen, optimum for fruit production. The excess of carbohydrates in old bearing trees can also be used to advantage by applying more nitrogen to the soil.

It is only after understanding these physiological and nutritional factors which underlie standard horticultural practices like pruning of trees and nitrogen application to the soil, combined with climatic conditions that an amateur orchardist is better armed for modern scientific fruit farming.



TOMATO JUICE

Its Preparation and Preservation

—By—

DR. GIRDHARI LAL, Ph.D. (London), D.I.C. (London),
Assistant Fruit Biochemist, Lyallpur.

Quite recently, the production of canned tomato juice has considerably increased in foreign countries and a fair amount of this product is now found in the Indian market. The dietetic value of tomato products is considerably enhanced by the presence of a large amount of Vitamins in fresh tomatoes. Vitamins, in general, are known to be adversely affected by the application of heat, but since the least amount of heat is applied (see below) in preparing tomato juice, it is believed that the deleterious effect on its Vitamin content may be very limited. Investigation into this aspect will be undertaken as soon as time and facilities permit.

As in our Province, tomatoes can be had very cheap during the season (April, May and June), it was realized that such fruit could be very profitably utilized besides other products for the preparation of tomato juice—a very delicious and healthful drink.

Experiments.—In order to see the standard of composition maintained by foreign packers of tomato-juice, a few samples were analysed with the following result:—

Percentage of solids in pulp at 68° F. 5.66.

Specific gravity at 68° F. 1.0240.

Percentage of common salt (Sodium chloride) 0.89.

Acid (as citric acid) 0.38.

In summer 1935, experiments on two varieties of tomatoes, locally known as 'Desi' (fruit flat, round and of irregular shape); and 'Peshawari' (fruit rather oval, small and of regular shape) were conducted and the juice obtained from these two varieties under different methods of extraction, dilution, etc., after addition of an appropriate amount of common salt, were separately preserved with 0.1 per cent sodium benzoate and also pasteurized at 212° F (boiling water) for half an hour.

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The results of these experiments have shown that all sets of juice preserved with sodium benzoate were spoiled within a week of canning, whereas no spoilage occurred in the pasteurized juice. During storage for the last one year, the pasteurized juice has retained fresh tomato flavour to a marked degree, the 'Peshawari variety' yielding a relatively better quality product than the 'Desi'. During this season, packing of juice has been very satisfactorily done in bottles instead of cans.

Method of Preparation and Preservation.

Step 1. Take fully ripe, red-coloured tomatoes, wash thoroughly and trim carefully green and rotten portions.

Step 2. For work on a larger scale, crush the sorted and trimmed tomatoes by passing them through a crusher, consisting of two revolving, adjustable, grooved wooden rollers placed horizontally. Smaller lots of tomatoes can be crushed with a wooden ladle in a non-corrodible vessel. Boil the crushed mass in a steam-jacketed kettle (see note below) for 3 to 5 minutes (for work on a home-scale, open vessel in direct heat may be employed), pass it through a sieve of one millimeter mesh, (preferably of nickel or monel metal) covered with a thin muslin cloth, (for work on a commercial scale, special pulping and straining machines can be purchased).

Note:—For rapid heating and to avoid high temperatures for a long time, (which adversely affect the colour and quality of the product) special steam-jacketed kettles are used. These kettles which can be had of any desired capacity, are made of copper, aluminium, monel metal or stainless steel, and are circular in shape. They are enclosed, to a certain depth, in an outer closed-jacket having a coil running through it—one end of the coil is connected to a steam feed (steam at 40 to 80 lbs. pressure) from a boiler and a safety valve is fitted on the other to allow the steam to escape when the pressure rises above a certain limit.

Step 3. Put the strained pulp (seeds and skin removed) in the steam-jacketed kettle or in an open pan on direct heat for smaller lots, and just bring the mass to a quick boil (avoid overheating in the case of direct heat), and cut off the steam or remove the direct heat as the case may be.

Note:—If the right type of raw material is used, the above process yields a product of the right consistency, but in case slightly over-ripe fruit is used, the juice obtained may be too thick, in which case it is diluted with an appropriate amount of water (only a very small amount

of water is required to be added), so that the finished product contains about 6.0 per cent solids. Solids in the pulp can be determined by a specific gravity determination.

Determination of Total Solids.—Strain the juice through a thick cloth and determine the specific gravity of the strained juice at 68° F by a hydrometer. Read the percentage of total solids in the pulp corresponding to the observed specific gravity from the tables given in textbooks on the subject.

Step 4. Add common salt at the rate of one part by weight per 100 parts of juice. Pour the juice while hot in sterilized bottles (i.e. bottles which have been previously boiled in water for half an hour) and seal them air-tight. Place these bottles in a vessel having a false bottom, cover the bottles with water which may be kept boiling for half an hour. Remove the bottles and place them in a cool dry place. The product can also be packed in cans, for which purpose a special equipment can be obtained which is rather expensive for home-scale production.

Note:—It may be pointed out that in this country where fruit preservation industry is still in its infancy and people are rather suspicious about the contents of tins (these being not visible), it is advisable that new products, like tomato juice, should be introduced into the market in glass containers, as the contents will be visible to the consumer and he will know what he is buying.

The above method has been evolved under the fruit and vegetable preservation scheme in the Punjab, financed by the Imperial Council of Agricultural Research. Any further information on the subject can be had from the Fruit Specialist Punjab, Lyallpur.

Canning on a Commercial Scale.—Our readers will be greatly interested to learn that the New Era Industries, Limited, (10-Nisbet Road, Lahore) are going to take up canning and preserving of fruits and vegetables, in all branches on a large commercial scale, on scientific lines. We congratulate the Company on its wise choice of such a profitable line, which, if developed properly, should soon grow into a leading industry of the province. The bright prospect of this industry in India, and particularly in the Punjab, have been often emphasised by the leading authorities on this subject. We wish the New Era Industry, Ltd., a great success.

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WHAT THE SCIENTISTS SAY

(a) Depressing Effect of Wind on Growth and Yield of Citrus Trees

(By VINCENT F. BLANCHARD, Farm Advisor,

Ventura County, U.S.A., California—Citrograph June 1934.)

After visiting a good number of orchards in this area with a view to determine the influence of wind on the growth and yield of fruit trees, the writer concludes that adequately protected fruit trees were much larger and bore greater quantities of fruit than unprotected trees. For instance, in a lemon orchard the protected trees yielded 710 fruits per tree against an average of 97 fruits per unprotected tree. The protected trees grew $1\frac{1}{3}$ times larger and bore fruit of a much better quality than the unprotected ones.

Another orchard, where oranges and lemons alternated, also showed that protected trees yielded an average of 288 fruits per tree against an average of 55 fruits per unprotected tree. The protected trees grew to more than double the size and were much more vigorous, with better colour and larger leaves than unprotected trees.

(b) Bud Union Effect in Citrus

(By ROBERT W. HODGSON & S. H. CAMERON

University of California—Calif. Citrograph October 1935.)

Bud union in Citrus throws the tree into bearing earlier than otherwise. Budded orange trees of standard varieties are much less vigorous and bear much earlier than seedling trees of the same rootstock and age.

The difference in vigour and age of bearing in the case of seedling trees compared with budded trees of identical root stock is greater, than can be attributed entirely to the effect of bud union.

(c) A Twenty-Five Years Test of Commercial Fertilizer for Grapes

(GLADWIN F. E. Horticultural Abstracts, 1936)

Nitrate of Soda 250 lb. per acre, Super-Phosphate 300 lb. Muriate or Sulphate of Potash 200 lb. have been applied annually for 25 years in various combinations to plots of vines on gravelly loam soil rich in Potassium but low in Nitrogen and Phosphorus in lake Erie grape belt. Nitrogen increased yield, quality, cane and leaf growth. Potash in combination with the other two increased yield of fruit and wood. Phosphoric acid improved cover crop and not the vines, 2,000 lbs. Hydrated Lime per acre every third year on the complete fertilizer plot depressed yield of fruit and wood. Nitrogen and Potash in whatever combination always proved

profitable. None of the treatment influenced fruit maturity or winter injury or sugar content of the fruit in any way.

(d) A Study of the Relation of Size of Apples to Number of Seeds and Weight of Spur Leaves

MURNEED & SCHOWEN GERDT G. C.

Horticultural Abstracts—Dec. 1936.)

A study was undertaken to determine the relation between size of apple fruits, number of seeds per fruit and leaf weight per spur. Several hundred bearing spurs were collected at random from the inside (shaded) and outside (not shaded) portions of a large "wealthy" tree maturing a heavy crop. The results show that there was no correlation between leaf weight and seed number. A tentative conclusion is, however, drawn that with shaded trees and branches, large apples with a high number of seeds will result; whereas with non-shaded trees or branches, comparatively larger fruits may be formed in the presence of fewer seeds due to greater average leaf area per spur per branch and a high photo-synthesis efficiency of the leaves.

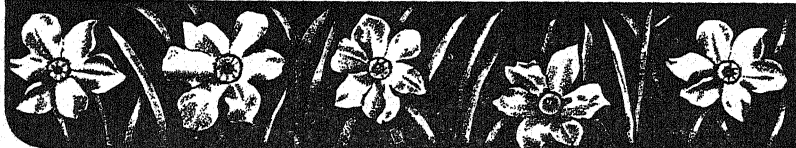
(e) Size of Peaches as Affected by Soil Moisture
(HENDRICKSON A. H. & VEIH MEYER F. T.

Horticultural Abstracts 1935)

The experiment was conducted in a Phillip's peach orchard at Devis, Calif. The soil was a loam, the field capacity for the top 3 feet was about 22 per cent. and the permanent wilting percentage was 11 for the top 3 feet, and 9 for the next 3 feet. Four irrigation treatments A, B, C & D, were started in 1931. In A water was applied whenever the supply in the top three feet of soil fell to about 13 per cent. or 14 per cent., i. e., within 2 or 3 per cent. of the permanent wilting percentage. In B water was not applied until the supply in the first six feet had been reduced to about the wilting percentage. In C irrigation water was applied as in A upto July 1st after which no further water was given. In D the trees were left un-irrigated. As regards yield over the four years 1931-34 there was no difference between A & B. C was somewhat lower but not always significantly so, and D gave definitely smaller yield.

Size, as reckoned in the minimum of 2 3/8" diameter allowed by canneries, showed more striking differences. In both 1933 and 1934 A gave over 70 per cent. marketable fruits, B averaged about 50 per cent., C gave over 14.6 per cent. while D produced practically non-marketable fruits.

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